THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXVII. No. 667.] LONDON, FEBRUARY 22, 1876. [28TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL

COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.

The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.

RAMSAY'S PATENT CONDENSED COKE.

DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.

GAS-RETORTS, introduced 1838. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.

Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubitt Town. Large stocks kept.

Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GENUINE TORBAY PAINT
AND
SPECIAL GASOMETER PAINT
(Mixed ready for use).

These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.

They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.

The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.

STEVENS & CO.,
(SUCCESSORS TO SAMUEL CALLEY. ESTABLISHED 20 YEARS.)
21, GT. WINCHESTER ST., LONDON.
WORKS: BRIXHAM, TORBAY.

THOMAS PROUD,
MANUFACTURER OF
WOOD GRIDS
FOR
SCRUBBERS
AND
PURIFIERS.

BROOKFIELD IRON-WORKS,
103, ICKNIELD STREET EAST,
BIRMINGHAM.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and OTHER OBJECTS in FIRE-CLAY," and they were also awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.

COWEN'S GARESFIELD COALS.
Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

JOS. COWEN & Co. are the only Manufacturers of FIRE-BRICKS and CLAY RETORTS at BLAYDON BURN.

JOHN RUSSELL AND CO.,
THE WEDNESBURY TUBE-WORKS, WEDNESBURY;
AND
THE ALMA WORKS, WALSALL.
Established at the commencement of Gas Lighting.

WAREHOUSES:
69, UPPER THAMES STREET;
COMMERCIAL STREET, SPITALFIELDS;
5, CHARLES STREET, SOHO; and
16, SOHO SQUARE,
} LONDON
35, 36, 37, & 39, GRANBY ROW, MANCHESTER.

J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.

Lists may be obtained on application to
69, UPPER THAMES STREET, LONDON.

JOHN BENT & SON,
BELL BARN ROAD, BIRMINGHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS,
OF
FIRST-CLASS MATERIALS & WORKMANSHIP;
Also, STATION-METERS, PRESSURE-GAUGES, STREET-LAMPS, REGULATORS, &c.

ESTABLISHED 1830.

THOMAS PIGGOTT & CO.,
SPRING HILL, BIRMINGHAM.
MANUFACTURERS OF
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
SUGAR, SALTPETRE, AND ALL KINDS OF PANS.
Roofs, Girders, and Bridges, and General Smith's Work.
LONDON AGENT—W. G. DAVIS, 2, Brabant Court, Philpot Lane, E.C.

J. & H. ROBUS,
CONTRACTORS
FOR THE
ERECTION OF NEW & REMODELLING OF EXISTING GAS-WORKS.

RETORT-SETTING A SPÉCIALITÉ.

RETORTS SET, AND GUARANTEED TO BURN OFF A CERTAIN AMOUNT OF COAL, OR ELSE NO MONEY TAKEN FOR THE CONTRACT.

PLANS ON APPLICATION.

Retort-Setters sent to all parts of Europe and America.

Address, J. and H. ROBUS,
BELL GREEN, CATFORD, LONDON, S.E.

THE
NITSHILL COMPANY'S
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.

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JAMES M'KELVIE,
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GEORGE GLOVER & CO.,

MANUFACTURERS OF

IMPROVED DRY GAS-METERS,

WARRANTED TO MEASURE CORRECTLY, AND NOT TO VARY.

EXTENSION OF PREMISES.

G. G. & Co. having had their premises entirely rebuilt, are now fairly in possession of large and commodious workshops, specially adapted to the requirements of the trade, and they are prepared to execute orders, large or small, with promptness and despatch.

THEY KEEP IN STOCK METERS OF ALL SIZES, UP TO 300 LIGHTS.

RANELAGH WORKS, RANELAGH ROAD, PIMLICO,
LONDON, S.W.;
236, GEORGE STREET, GLASGOW; and 30, LANCASTER AVENUE, MANCHESTER

AGENT FOR AUSTRALIA:
Mr. A. DEMPSTER, POST-OFFICE PLACE, MELBOURNE.

G. G. & Co. have just been awarded a SILVER MEDAL for Gas-Meters and Gas Apparatus at the Exhibition of the "Society for the Promotion of Scientific Industry," Manchester.

SILVER MEDAL, PARIS EXHIBITION, 1867.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS

AND

LAP-WELDED IRON AND HOMOGENEOUS METAL BOILER TUBES.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools.

London Offices: No. 4, Cloak Lane, Queen Street, E.C.

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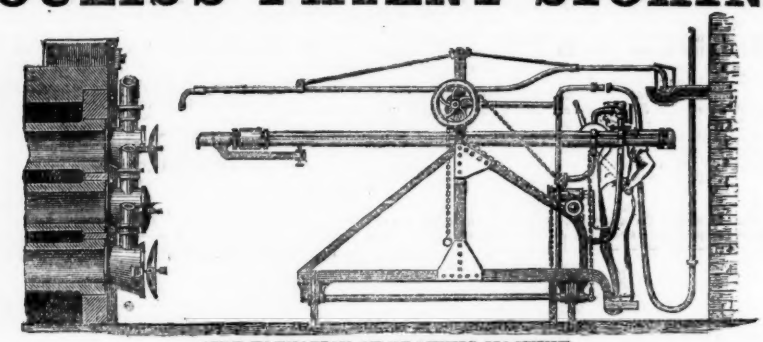
LONDON: 157, UPPER THAMES STREET, E.C.

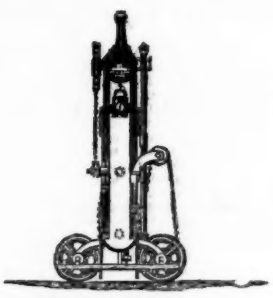
LIVERPOOL: No. 63, Paradise Street. | PARIS: No. 38, Rue du Chateau d'Eau.

MANCHESTER: Barlow's Croft, Chapel Street, Salford. | LILLE: No. 38, Rue Grande Chaussee.

FOULIS'S PATENT STOKING MACHINE.



SIDE ELEVATION OF DRAWING MACHINE.



END ELEVATION.

(*The Charging Machine will be Illustrated in next week's Advertisement.*)

Makers: TANGYE BROTHERS and HOLMAN, London and Birmingham; ADAM WOODWARD and SON, Manchester; ROBERT LAIDLAW and SON, Glasgow; MASCHINENBAU-ACTIEN-GESELLSCHAFT HUMBOLDT, Kalk bei Deutz; Or all particulars may be had from JAMES WOTHERSPOON, 31, St. Vincent Place, Glasgow.

WEST'S GAS IMPROVEMENT COMPANY,

LIMITED,

ARE NOW PREPARED TO SUPPLY AND ERECT THEIR PATENTED MACHINERY FOR

CHARGING AND DRAWING GAS-RETORTS,

And to enter into arrangements with GAS COMPANIES for its use upon moderate terms of Royalty.

The Patented Machinery has secured the approbation of all Engineers who have visited the MAIDSTONE GAS-WORKS, *where it is in full operation, and may be inspected at any time on application to the Manager.*

The advantages attending its use are—

INCREASED VOLUME OF GAS PER TON.—INCREASED YIELD PER RETORT.—INCREASED BULK OF COKE FOR SALE.—REDUCTION IN LABOUR AND LESS DEPENDENCE ON SKILLED STOKERS.

A Pamphlet containing a description of the Machinery, and Copies of Reports on the working of the same, &c., will be forwarded on application to the MANAGING DIRECTOR, Maidstone. Communications may also be addressed to the Consulting Engineer, R. P. SPICE, Esq., M. Inst. C.E., 21, Parliament Street, London, S.W., or to the Engineer and Analyst, F. W. HARTLEY, Esq., A. Inst. C.E., 55, Millbank Street, London, S.W.

TRADE MARK

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

CROWN TUBE-WORKS,

WEDNESBURY, STAFFORDSHIRE.

WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM.

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

London Agent: W. G. DAVIS, 2, BRABANT COURT, PHILPOT LANE, E.C.

THE

LANCASHIRE GAS-METER COMPANY,

LIMITED,

FALCON STREET, OLDHAM,

MANUFACTURERS OF

GAS-METERS, GOVERNORS, EXPERIMENTAL GASHOLDERS, &c.

HENRY THOMAS, Managing Director.

JOHN WRIGHT AND CO., ESSEX WORKS, BIRMINGHAM,

Beg to call the attention of MANAGERS and DIRECTORS of GAS COMPANIES to the following letter which they have lately received.

COPY OF LETTER RECEIVED FROM MAGNUS OHREN, Esq.

Crystal Palace District Gas Company, Lower Sydenham, S.E.

To Messrs. John Wright and Co., Essex Works, Birmingham.

Dear Sirs,—In reply to your inquiries, I am glad to state that the use of GAS COOKING AND HEATING STOVES has been a complete success here. We have several hundred in use in our districts. We also find it advantageous to let out Stoves at a small rental. We have now 275 Stoves at rent.

The Stoves you make I can with confidence recommend, having so many in use, and giving satisfaction. I need scarcely point out to you the advantage to Gas Companies to recommend the use of Gas Stoves to their Gas Consumers, even where they do not supply them on sale or rent, as the use of Gas Stoves brings day consumption, and thus the Company make a profit by day as well as by night.—I am, dear sirs, yours faithfully, MAGNUS OHREN.

Size, 25½ in. high; 14 in. wide; 12½ in. back to front.

Price 50s., complete with Pan and Gridiron.

GAS HEATING STOVES

(TERRA COTTA AND IRON).

THE CHEERFUL STOVE.

COOKING STOVES.

BREAKFAST COOKERS.

BATHS HEATED by GAS

GAS STOVES

For Boiling, Broiling, Preserving, Heating Flat Irons, and for all other Domestic Purposes.

Gas Companies and the Trade who have not our Illustrated Catalogue are respectfully requested to apply for same.

A LIBERAL DISCOUNT to the TRADE.

No. 4003.

THE CHEERFUL GAS STOVE, with Copper Reflector,
Has all the appearance of a Bright Fire.
PRICE from 32s.

THE

IMPERIAL METER COMPANY,

LIMITED,

KING'S ROAD, LONDON, N.W.,

OFFICE: 115, VICTORIA STREET, WESTMINSTER, S.W.,

MANUFACTURERS OF

"WET" & "DRY" GAS-METERS IN IRON & TIN-PLATE CASES,

STATION-METERS AND GOVERNORS, STREET-LAMP METERS, BOXES, AND REGULATORS FOR THE AVERAGE METER SYSTEM.

TO GAS COMPANIES, ENGINEERS, &c.

These Works are in full operation, and it will be the aim of the New Company not only to keep up the excellent workmanship of their predecessors, but, by the introduction of special machinery, to manufacture **Meters of a higher standard than is usually given, without increasing the cost.**

Special attention is invited to the Compensating Wet Gas-Meter of De Castro and Burton, which is now becoming so generally adopted, and is more simple in construction than any other Compensating or Ordinary Wet Meter. There is but one centre of friction to be overcome by the gas. By its self-adjusting principle it maintains an unvarying water-line; and the reservoir contains sufficient water to supply the Meter for twelve months without attention. It is unaffected by "tilting," and cannot be "flooded" by any pressure.

The Company also manufacture Dry Meters upon the most improved principle, and all their Meters being made to standard gauges, the most accurate measurement is obtained.

Attention is also called to their Dry Meters in Wood Cases, as used by some of the London Gas Companies. These Cases are a great preservation to Tin-plate Meters, especially in seaport towns, where the air is impregnated with salt; they are also particularly suited for export.

The Company repair or convert every description of Wet Gas-Meters to De Castro and Burton's Patent.

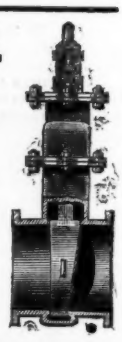
JOSEPH AIRD,

WELLINGTON TUBE-WORKS, TIPTON, STAFFORDSHIRE,

MANUFACTURER OF

EVERY DESCRIPTION OF TUBING, GAS, STEAM, HYDRAULIC TUBES AND FITTINGS,
EITHER BLACK, GALVANIZED, OR ENAMELLED HOT WATER TUBES AND FITTINGS,
CORE BARS, COILS, COCKS (IRON OR BRASS),
CHANDELIERS, &c., GAS-FITTERS' TOOLS, GAS TONGS, STOCKS, TAPS, DIES, &c., &c.,
HANDRAIL TUBINGS, IRON AND BRASS, PLAIN OR TWISTED,
TELEGRAPH TUBES OR POLES, &c., &c.

C. & W. WALKERS' DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves have taken the place of the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

MIDLAND IRON-WORKS,

DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON WHARF:

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;

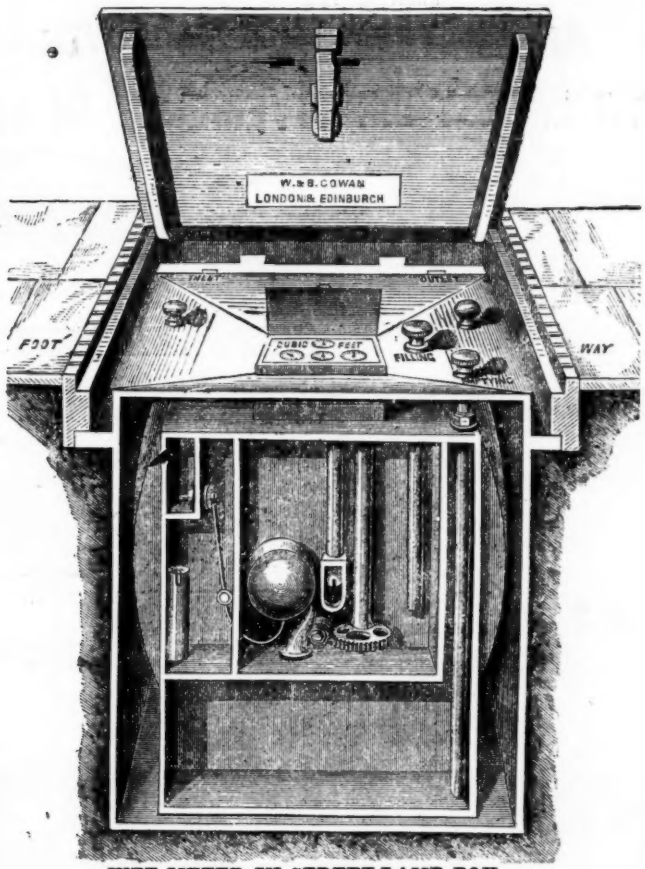
LIVERPOOL—1, Back Leeds Street,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

AVERAGE METER SYSTEM

FOR

STREET-LAMPS.



WET METER IN STREET-LAMP BOX UNDER ROADWAY.

The above is offered as the best and simplest arrangement of Street-Lamp Wet Meter, and Box for placing under the roadway.

The Index is read, the water supplied, and the overflow-box pumped, without disturbing any inside lid, but only the footway door.

When necessary to take out the Meter, remove the filling and emptying plugs, and the two thumb-screws which secure the inside lid, which can then be taken off, and the Meter disconnected at inlet and outlet unions.

To prevent water entering the box, the inside lid is made raised, and the edges returned over those of the box, and the thumb-screw and index openings are protected by "collars."

The footway frame can be supported either by brick-work or by "lugs" cast on the box.

The Meter shown is on Esson's Patent Fountain Principle, but it will be understood that the same box arrangement is equally applicable to non-fountain meters; and if these latter are furnished with WARNER AND COWAN'S PATENT SELF-REGULATING DRUMS, the long range of water-line renders a fountain superfluous, while the *registration will be practically unvarying.*

DRY METER IN STREET-LAMP PILLAR.

WET METER IN STREET-LAMP PILLAR.

W. & B. COWAN'S large and increasing Export Trade is provided for by their keeping constantly on hand a very large stock of both Wet and Dry Meters, ready for immediate despatch to the British Colonies and Foreign Countries.

W. & B. COWAN,

ESTABLISHED 1827,

KING HENRY'S WALK,
BALLS POND ROAD,
(NEAR DALSTON JUNCTION STATION.) **LONDON, N.**

BUCCLEUCH ST. WORKS,
EDINBURGH.

WILLIAM SUGG,

GAS ENGINEER,

VINCENT WORKS, VINCENT STREET,

WESTMINSTER, S.W.

WILLIAM SUGG'S LATEST IMPROVEMENTS IN GAS-BURNERS.

The "LONDON" ARGAND BURNER, with SELF-ACTING GOVERNOR (Patent).

"Westminster" Pattern Shade, as used in the Ministers Rooms and Lobbies of the Houses of Parliament. This Burner is No. D size, and, with a consumption of 5 cubic feet per hour, gives about 2 candles more light than the Gas Referees model, called the No. 1 "London" Argand Burner.

With 5 cubic feet per hour of gas, which gives a light equal to 14·3 parliamentary sperm candles (as tested by the Sugg-Letheby Standard Burner), the ordinary Argands give only a light equal to 10 sperm candles, while the No. F Patent "London" Argand Burner gives a light equal to 18½ sperm candles, or 85 per cent. more light for the same quantity of gas consumed.

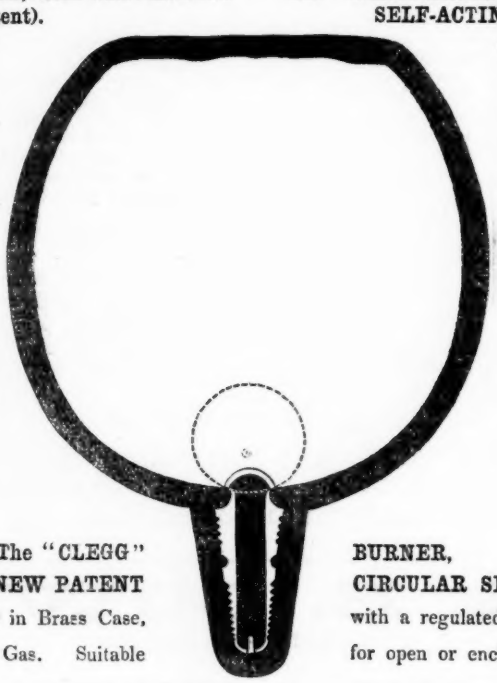
The "CHRISTIANIA" FLAT-FLAME BURNER, with SELF-ACTING GOVERNOR (Patent).

This Burner has been pronounced by the most eminent Engineers of the day to be the perfection of a flat-flame Burner.

The Shades, which are made in a beautiful white glass called Albatrine, are manufactured *exclusively* for these Burners, and cannot be obtained elsewhere.

The light emitted from this Burner is very white and soft to the eyes, and is about 30 PER CENT. superior to the ordinary fishtail.

Numerous other pattern Shades, Plain or Ornamental, may be obtained with these Burners.



The "CLEGG" BURNER, with the NEW PATENT CIRCULAR SLIT.

Is a flat-flame Burner in Brass Case, with a regulated opening for the admission of Gas. Suitable for open or enclosed Lights.

Price Lists and Prospectuses, with description of all the "London" Argand and other Burners, and their proper Shades, Supports, &c., forwarded post free on application.

TANGYE BROTHERS AND HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

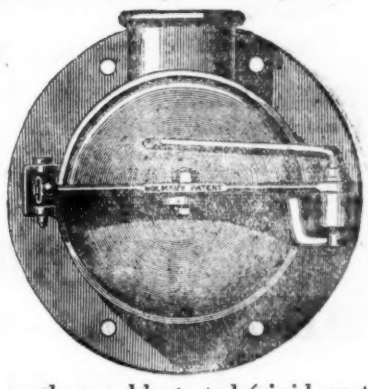
SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH

HOLMAN'S NEW PATENT BRACKETED CROSS-BARS,

Anti-Friction Catches and Eccentric Fastenings.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required. Holman's New Self-Sustaining Cross-Bar ensures freedom of joint and maintains parallel position of the Lids.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested (rigid cast iron is now successfully employed), nearly 20,000 being in use at various Gas-Works in London and the Provinces, among which may be mentioned:—

The Gaslight Co., Beckton (where, by the end of 1875, nearly 4000 were in use).
" Gaslight Co., Bow Common.
" Gaslight Co., Silvertown.
" Gaslight Co., Lupus Street.
" London Gaslight Co.
" Independent do.
" Phœnix do.
" South Metropolitan Gaslight Co.
" Commercial do.
" Imperial do.
" West Ham Gas Co.
" Gas-Works, Barnet.

The Gas-Works, Royal Arsenal, [Woolwich.
" do. Lower Sydenham.
" do. Brentford.
" Consumers Gas Co., Woolwich.
" Alliance and Dublin Gas-Works.
" Edinburgh do.
" Manchester Corporation do.
" Salford do. do.
" Rochdale do. do.
" Liverpool Gas-Works.
" Birmingham do.
" Birkenhead do.
" Nottingham do.

The Newcastle-on-Tyne Gas-Works.
" Lurgan do.
" Carmarthen Gas-Works.
" Merthyr Tydfil do.
" Windsor do.
" Leeds do.
" St. Albans do.
" Over Darwen do.
" Rotherham do.
" Aylesbury do.
" Bournemouth do.
" Ystrad do.
" Cardiff do.
" Rochester do.

The Keighley Gas-Works.
" Aberdare do.
" Ballymena do.
" Richmond do.
" Stalybridge do.
" Longton do.
" Exeter do.
" Ross do.
" Falmouth do.
" Barrow-in-Furness do.
" Belfast do.
" Wakefield do.
And other Provincial and Foreign Gas-Works.

IMPORTANT TESTIMONIAL.

The Gaslight and Coke Company (Commonly called the Chartered Gas Company), Beckton, North Woolwich, July 2, 1874.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—In answer to your inquiry respecting the Self-Sealing Lids, I beg to say that they continue to work well, and I have every reason to be satisfied with them.

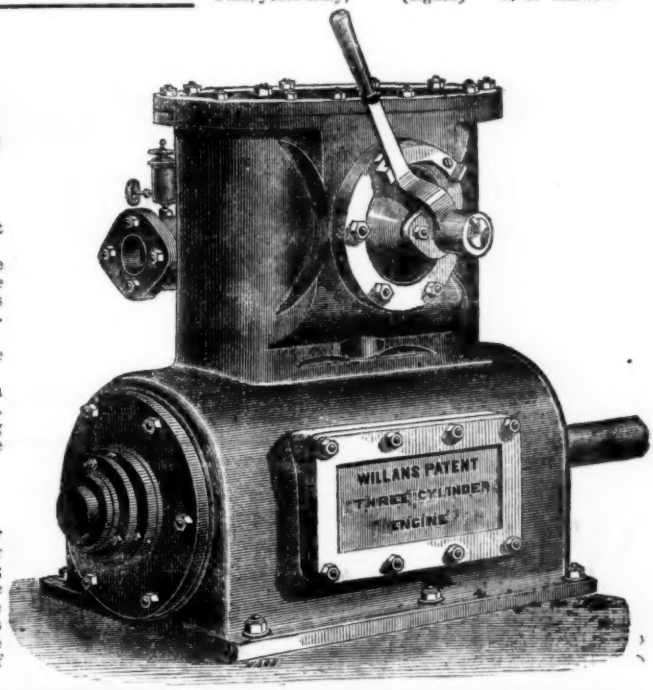
I should be very sorry to return to the old system of Luting, and our stokers here freely acknowledge the benefit to them of the new system.

I am, yours truly, (Signed) G. C. TREWEY.

WILLAN'S PATENT THREE-CYLINDER ENGINE,

ESPECIALLY SUITED TO DRIVE

GAS-EXHAUSTERS.



This Engine is exceedingly simple in construction, unlikely to get out of order, and can be safely driven by the most unskilful.

No fly-wheel is necessary, there being no "dead centre." The connecting-rods being always in compression, there is no blow on the crank-pin at either end of the stroke, and consequently the Engine is free from the knocking which is nearly always present where double-acting cylinders are used.

All the working parts, being contained in the cylinder casing, are thoroughly protected from injury by dust, &c.

The Engine occupies very much less space than is taken up by an ordinary engine doing equal work; it is also of considerably less weight.

The foundations required for it are of the simplest kind. Driving gear can be attached to either end of the crank-shaft, so that the Engine may at will be made either right or left hand.

From the "Engineer," Oct. 1, 1875.

"Although the engine is only single acting, it will do considerably more work than an ordinary double-acting engine of the same cylinder capacity. There is no thump, no matter how loose the bearings are; indeed, the whole of the bearings may be quite worn out before the working of the engine is affected. It is perfectly noiseless, and the speed at which it can be driven is very great. The working parts can be examined at a moment's notice, by removing the door at the side of the casing. These parts are very few in number, and are of the simplest description."

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THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, FEBRUARY 22, 1876.

Circular to Gas Companies.

We have obtained a copy of the Metropolis Gas Companies Bill, introduced to the House of Commons by Sir James Hogg, and find it identical with the Bill of last year, as settled by the Select Committee. It is on the paper for a second reading on Friday next; but, in the meantime, Mr. Young is to ask Sir J. Hogg to name a later day, for reasons which will be found stated in another column. We shall not be surprised if compliance with the request be refused. It may be urged, and not unfairly, that the Bill, as it stands, has been before the gas companies for some six or seven months, and if they could not make up their minds in that time—with the certainty of the re-introduction of the Bill before them—a week or two longer for deliberation can be of no importance or value. What it is now of importance for us to know, is, the action which the Government will take, in relation to the question. Last year they stepped in with a letter from the Board of Trade to the Select Committee, pointing out the injustice of a simple downward sliding scale of dividend. Rumour states, and at present we have only rumour to guide us, that the Government have fallen in with a suggestion of the Corporation of the City of London, and will insist—or rather, say, recommend—that, in all future issues of capital, the shares shall be sold, by auction, to the highest bidders. Now, it is of some consequence for us to know, as soon as possible, what are the actual designs of the Government. Having learnt them, we may reasonably ask for some time to consider the actually novel proposals.

The Regulations Bill, it will be remembered, is silent on the question of capital, except that it would enact that borrowed money, converted into shares or stock, shall not be entitled to more than a five per cent. dividend. A clause to this effect is now introduced into all the special Acts of gas companies, and, therefore, it could not be objected to in the Metropolis. Further than this, the Select Committee made the suggestion, that companies should raise all further capital at the lowest possible rate of interest. In accordance with this suggestion, the Commercial Company proposed half share and half loan capital; and the Chartered, not wishing to be behind in liberality, offered to raise all further capital by way of loan. This latter proposal has been everywhere disapproved of, and has, necessarily, been dropped. We are somewhat in ignorance as to the proposals the Chartered Company will make in their amended Bill; but it must be accepted as a fact, that they virtually concede the points most strongly urged by the metropolitan authorities, and that, therefore, so far as they are concerned, the Bill of the authorities, now before the House of Commons, will be practically unopposed. How far other companies may agree, and to what extent opposition will be carried this year, we have, at present, no means of knowing.

We insert to-day, however, a communication from a gentleman, very largely interested in metropolitan gas undertakings, who is evidently inclined to accept the proposed new legislation, if he can only secure finality. He wishes to extort a sort of statutory promise from the authorities, that if this Bill be passed, it shall once and for ever settle the metropolitan gas question. The writer must know very well, that it is no more in the power of the authorities, than it is in the power of Parliament, to decree finality. The first Reform Bill was to have been a final measure, but we have had several Reform Bills since 1832. The Metropolis Gas Act, 1860, was accepted as a final settlement of the gas question; but the gas companies may be said to have been in Parliament ever since that year. There can, then, be no hope that this measure, if it should pass, would be regarded as a final settlement of the question, especially if it should turn out to the advantage of the companies; and since it may, for some year or two, prove advantageous, we, on our parts, at all events, shall anticipate an early revival of the gas agitation. It is of no use attempting to disguise or blink the fact, that the object of a majority among the authorities is to reduce the value of gas property. There are those, of course, who would gladly see the value of some companies increased; but we speak only of the general policy. The Metropolitan Board of Works still dream of getting possession of the gas-works, and the sole and simple object of their proceedings is to depreciate the value of the largest undertakings they would have to purchase. If, then, this measure, as passed, should prove of advantage to the Chartered and Imperial Companies, amalgamated or apart, there would be an instant renewal of the gas agitation. Our correspondent must see that finality is altogether a dream. Metropolitan gas agitation will only end with purchase. Until that, or something like it, has been achieved, there will be no peace, unless the gas companies are seen to be going to ruin. So soon as anything less than maximum dividends are declared, agitation will cease, and laughter will commence.

But we are not yet in despair. The last proposition which comes before us—the auction clauses—when taken in connexion with the sliding scale, we may say candidly, promises, to our minds, great advantages, at all events in years to come. The introduction of a considerable amount of non-dividend bearing capital, will, no doubt, make dividends more secure in the troublous times which, we feel sure, will arrive. For this reason, after full consideration, we strongly recommend the companies to accept the auction clauses. We have, however, no word to withdraw. They would constitute a gross infraction of existing legal rights; but they will most probably, in the end, work out well. At all events, it seems to us, that with the sliding scale they will in the result prove advantageous to the original shareholders in the older companies.

The writer, whose communication we publish to-day, is very anxious to get rid of Referees, and desirous to reduce the testing of gas to the simple determination of the illuminating power, and the ascertainment of the presence or absence of sulphuretted hydrogen. Frankly speaking, we cannot say that the Referees have been of the smallest advantage to the gas companies. They have cost, in past times, a great deal of money, and now, at a reduced rate, are, we fear, dear at the price. One has already harassed a company, by means of a patent; and another, working in a similar direction, may presently do the same. We have, however, our own opinions about sulphur purification, which have been repeatedly expressed, and to these we adhere. And the remark we make, once more, is, that if the public wish for gas as free as possible from sulphur, they must pay accordingly. The public must judge whether they derive little or no advantage from

the increased expenditure of a certain gas company in purification. It will be noted that the Regulations Bill continues the appointment of Referees, it may be, because the cost of them comes out of the companies—in the long run, of course, out of the pockets of the consumers. That will, however, be of no importance in the eyes of the authorities, if they can only achieve the triumph they seek for—viz., a reduction of dividend in the case of any single company.

We have now probably done with metropolitan gas affairs until we know the latest views of the Government on the question. In the present dislocated condition of the gas interest, any effective opposition from the companies, to whatever measures may be proposed, would appear to be impossible. Nevertheless, a distinctly obnoxious proposal might once more rally the disordered host, and there is, in the last event, the House of Lords, to whom to appeal. The Regulations Bill may once more be referred to a select committee, composed, perhaps, of the same members as last year. If the auction clauses be added, we hold a strong opinion that the companies may accept the Bill without opposition. Local authorities will, of course, look out for themselves. The writer, whose article we insert to-day, is so eminently qualfied to decide on the matter, that even if we differed from him, we should hesitate to express a judgment in opposition. Taking, then, the two proposals together—the upward and downward sliding scale, and the auction clauses—we may recommend the companies to agree with them, and save all further opposition. We should have preferred a different legislation, which we believe would have satisfied the companies, and would have been more satisfactory to the public. General amalgamation, with an amendment of the Act of 1860, nominee directors, and a division of profits, above ten per cent., with the local authorities, would, we believe, have been far preferable to the legislation actually proposed. But general amalgamation is now a dream of the past. A curious chapter of history may some day have to be written, and we shall not anticipate. For the moment, we wait a further development of a story, the plot of which is not within our cognizance.

We have received the report, for 1875-6, of the West of Scotland Association of Gas Managers, which contains, like the previous reports, a mass of information relating to the gas supply of Scotland. In this report some additional statistics are given, and a somewhat different arrangement of the information has been adopted. When noticing former issues, we have described the special features of the publication, and made remarks on some of the particulars. To-day we shall only notice one point. We observe that, with three or four exceptions, naturally in large centres of industry, lime is exclusively used in the purification of gas in Scotland. The reasons for this may be readily guessed; but what, we should like to know—and we mention it in the hope that the subject will be taken up for discussion at an early meeting of the Association—is the cost and the result of this exclusive purification by lime. When rich cannels are distilled, the removal of carbonic acid is a matter of little or no moment, and the lime can only be used to take out sulphuretted hydrogen and other sulphur compounds. Now, we should like to know to what extent this purification is effective. We feel bound to assume that every manager takes care that his gas is free from sulphuretted hydrogen. Will some of them tell us to what extent it is free from other sulphur compounds? We notice with some regret that, as regards the largest Scottish undertakings—*e.g.*, Aberdeen, Dundee, and Glasgow—no returns of purifying plant are made. It is to be hoped that the managers of these works will reconsider the matter, before another report is issued, and give the information desired. Hoping that we may soon hear something of the results of lime purification in Scotland, we may conclude this notice by saying, once more, that the publication of these annual reports reflects the highest credit on the West of Scotland Association of Gas Managers.

We are sorry to learn that the Imperial Company are not satisfied with the average meter system, as applied to the public lamps in the parish of Paddington, and have moved the Board of Trade to request the Referees to reconsider their decision, as to the mode of ascertaining the quantity of gas consumed. We believe the mode prescribed by the Referees was that applied by Mr. Hawksley at Nottingham, where it gave perfect satisfaction to the gas company, and also to a Corporation not easy to be pleased. With the special objections alleged by the Imperial Company, we have, at present, no acquaintance; but, as the Board of Trade have directed an inquiry, we shall soon be in possession of the information.

The report of Mr. G. W. Stevenson, on the Ipswich Gas-Works, has been published, and, taken altogether, it is not very unfavourable to the company. The capital of the company is not considered excessive, but the management is described as inefficient. The make of gas, per ton of coal distilled, has been only 8926 feet, and the sale per ton but 7838 feet; *ergo*, the carbonizing apparatus must be defective, and the distributory plant not in proper order. Further than this, very little money seems to have been realized by the sale of tar and ammoniacal liquor. These seem to constitute the chief offences of the company. Mr. Stevenson will, we are sure, agree with us, that it is much more easy to write a report than to manage a gas-work. We would undertake to show, upon paper, that every work in the kingdom might be much more profitably managed. We make, however, no complaint against this report, for the writer counsels liberal dealing with the company. The advantages of the purchase to the Corporation, we feel certain, are over-estimated. The Commissioners of Sewers of the Corporation of London cannot borrow money at less than four per cent., and, therefore, we may be sure that the Corporation of Ipswich could not borrow for three and a half per cent. The fact is, the competition of local authorities for loans is fast sending up the rate of interest, and we shall be surprised if they borrow much longer at less than five per cent. We shall only notice one other point. There is a dispute at Ipswich about an account for the supply of gas to public lamps, which Mr. Stevenson disposes of in a very summary way. He takes the lowest charge to a private consumer—Messrs. Ransome and Co., supplied at 3s. per 1000 feet—and calculating the amount of gas consumed in a lamp, and charging 3s. per 1000, he arrives at a sum, which he recommends the Corporation to tender as a full discharge. We hope the company will not accept it. To our minds, it is not even a case for arbitration.

The consumers of Ipswich had, one day last week, an opportunity of judging of the soundness of their gas-fittings. The man in charge of the purifiers at the gas-works made a mistake in shifting the valves, and filled a holder with raw gas. Thereupon arose loud complaints of a stench all over the town. The mistake was soon discovered, and the gas was sent back through the purifiers; but not before the inhabitants had discovered that all gas-fittings leak more or less.

The Maryport Town and Harbour Trustees have given notice, under the provisions of the Act they obtained last year, of their desire to purchase the undertaking of the gas company. The case will go to arbitration.

The Runcorn Improvement Commissioners are anxious to buy up the gas and water undertakings, and a committee has been appointed to confer with the company, in order, if possible, to settle terms.

We have to-day only space to congratulate the Corporation of Birmingham on their first gas balance-sheet. The discussion in the Town Council, reported in another column, suggests many remarks, which we must defer; but we may at once call attention to the observation of an Alderman, who expressed an opinion that the gas profits would pay every farthing of the expense of the Mayor's grand project for the improvement of the town. The gas consumers of Birmingham must look to this matter.

We need not make many remarks on the Eupion Gas trial. When the prospectus of the company was first issued, we observed that the Articles of Association would justify the directors in undertaking any sort of business, from "tinkering to financing." They chose the latter line, and it has brought them to the Old Bailey. Where next it will lead them to, is at present uncertain. We believe we may flatter ourselves that we had some influence in preventing the plunder of the general public by one of the most worthless schemes ever brought out.

A curious dispute has arisen in Dublin, where, as all our readers know, the average meter system is applied to the public lamps. The allegation has been made that the burners of the metered lamps consume much more gas than those affixed to the unmetered lamps, and thereby the Corporation of Dublin have been defrauded. After three days hearing, the Government auditor declared that the evidence against the objectors to the Corporation accounts was overwhelming, and pronounced in favour of the accounts. We shall give a full report of this case—which is quite *unique*—in our next, and then, perhaps, may indulge in some comments.

Water and Sanitary Notes.

The Parliamentary Committee of the Metropolitan Board of Works have reported to the Board, in favour of making an attempt to effect the purchase of the Metropolitan Water Undertakings, in accordance with the recommendation of the Royal Commission of 1869. The report, which we have not yet seen, is to be circulated, and will be discussed at the next meeting of the Board. Perhaps it will be well to defer any remarks on the question, until after the discussion has taken place. In the meantime, we simply observe that there is no fluttering in the dovecotes of the water companies.

Sir William Fraser had evidently better leave metropolitan local government alone, if he cannot urge better reasons for a change than he is reported to have brought forward, in the House

of Commons, last Tuesday. We shall presently have another weak gentleman, Lord Elcho, airing his oratory on the question of the Municipal Government of the Metropolis. In such hands the question of questions to-day is only made to look ridiculous. We expect much more of Sir Charles Dilke, and only wish that Mr. Lowe would devote his great talents to a full consideration of the matter. Let the obstructives and the jobbers say what they like, the day must come, and that before long, when something will be done for the better government of London.

A ratepayers meeting at Halifax have approved the Bill we have already noticed, promoted by the Corporation, for power to extend their water-works. But the surrounding Local Boards do not approve of the measure. There is something like a cry of "Stop thief!" raised. The Corporation of Halifax propose to come into the districts, and appropriate all the water, and then dole it out as it may seem convenient. We must confess to having a good deal of sympathy with the Local Boards of Elland and Warley.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

LXXXIV.

Chimney Shafts or Stacks.

(Continued.)

The accompanying engraving (fig. 3) represents one of the chimneys, half in elevation and half in section, erected at the Beckton Gas-Works, together with the method of forming the foundations for the retort-beds. The chimney, from the level of the fire-bars of furnaces to its summit, is 100 feet high, having a batter of 1 in 80, its area at the smallest part being 25 square feet.

The black line in section indicates a fire-brick lining within the shaft, but detached therefrom, a system often adopted in structures of this kind, when of large dimension, for the purpose already mentioned. There are two of these shafts in each retort-house, two passages being formed at the base in the centre, as shown, at the levels of the coke-hole and charging-floor, to permit of a free communication between both sides of the building.

The site of the Beckton works, being of an extremely loose character, it was necessary to excavate to a great depth, in order to obtain a suitable foundation on which the concrete is laid. This is represented as if a portion of it were broken away. The extensive nature of this part of the construction will be understood when it is mentioned, that upwards of 150,000 cubic yards of concrete are employed in the foundations of the buildings. For the purpose of economizing material and labour, a series of arches are built on the concrete over the whole area of the retort-house, that immediately beneath the chimney being of great strength to support the weight above. Thus the whole area of the retort-house, at the level of the coke-hole, is raised about four feet above the high-water mark of the Thames, which immediately adjoins the premises, so rendering any chances of inundation impossible.

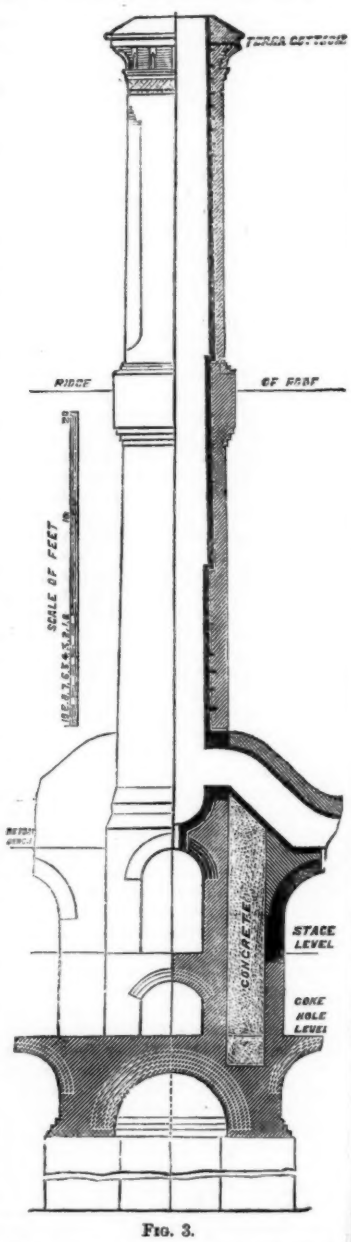

Fig. 3.

This shaft is in keeping with the whole of the works, which, in addition to their great efficacy for all requirements, are, by the judicious application of terra cotta, as shown in the capital of the shaft, and other buildings hereafter referred to, rendered highly ornamental, at a mere nominal expenditure.

An example of originality of design in the construction of shafts exists at the South Metropolitan Gas-Works. This stack is about 120 feet high, square in its interior and exterior; but, at each side of the square of the exterior, there are two buttresses, tapering from the bottom to the top, so that, in a manner of speaking, the chimney is supported by eight buttresses, which though giving great solidity to the structure, must have been acquired at considerable expense. This was built by Mr. George Livesey about twelve years ago, and is the only chimney of the kind we have ever met with.

For circular chimneys, all the bricks are required to be of the form here represented, and little explanation concerning their construction is necessary, as in the various points of base, foundations, and thickness of walls they resemble the octagon form; but more skill is required in building them than with the other descriptions. A good specimen of circular chimney exists at the Horseferry Road station of the Chartered Gas Company. It is 130 feet high, with an opening of 5 feet 8 inches in diameter, and is represented in fig. 4, half in section and half in elevation. (For economy of space, it is shown as broken off.) This, like the Beckton shaft, is lined, but only for a portion of its height. The top is surmounted by a cast-iron ornament, but this arrangement, as already shown, has been superseded, in subsequently erected chimneys, by Mr. Evans, in the application of terra cotta, which admits of great excellence and variety of design, at a moderate cost, and, of course, possesses unlimited durability.

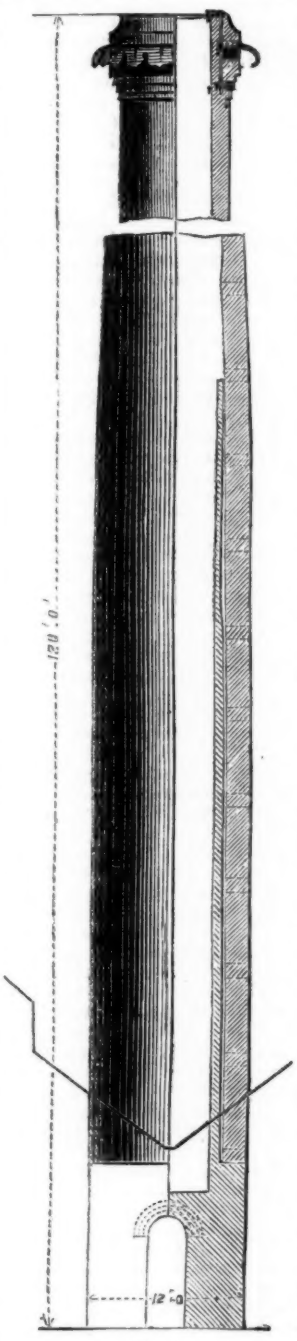

Fig. 4.

The most remarkable of this kind of structure, adapted for gas-works, exists at the establishment of the Edinburgh Gas Company, and was designed by Mr. Mark Taylor, formerly engineer of the company, about thirty years ago. The height of this splendid shaft is 329 feet from the ground, and its cost was about £5000

The necessity for this shaft arose from the circumstance that the Edinburgh Gas-Works are situated in a deep valley, which intersects the city, and divides the old from the new town, the ground on the slopes on each side, as well as the heights, being thickly populated.

In Scotland, formerly (and probably the same exists at the present day), in consequence of the inferiority of the coke obtained from the cannel coal solely used in the manufacture of gas, an inferior kind of coal was used for the purpose of heating the retorts; and we may suppose that the smoke arising from this fuel became offensive to the neighbourhood. To remove this objection, the colossal structure now in question was resolved upon.

The base of the foundation of this shaft is 40 feet square, and 6 feet 6 inches thick. On this commences the stone pedestal, which is carried up a height of 6 feet to the level of the ground. Above this point the pedestal of cut stone is carried up a height of 65 feet, being at its base 30 feet square, and, having a slight batter, is 27 feet 9 inches square at the top.

The stack is 264 feet high from the top of the pedestal, its outer diameter at bottom being 26 feet 3 inches, and at the top 13 feet 6 inches. Within this is a second shaft or fire-brick lining, 90 feet in height, and of a dimeter of 18 feet 10 inches at the bottom, and 16 feet 4 inches at the top. Thus, the smallest area of the interior of the shaft is upwards of 200 square feet.

We believe that there is no definite rule to be applied to ascertain the area of chimneys; but that it depends in a great measure on their height—the shorter the chimney, the greater will be the area required; but if we adopt the estimate of Mr. F. J. Evans, that

each square foot of a high stack is sufficient to carbonize five tons of coals in the 24 hours, the Edinburgh chimney is ample for carbonizing the enormous quantity of one thousand tons of coals daily. For that purpose, of course, the lateral flues leading thereto would be required of suitable capacity.

From these measurements we find that the side of the foundation is one-eighth of the total height of the chimney. The pedestal is one-fifth of the height above ground, and the diameter of the base of the stack is one-tenth of its height.

To convey more forcibly to the mind the magnitude of this chimney, it may be added that, its pedestal of 65 feet is as high as an ordinary shaft for a work producing 40 or 50 million cubic feet per annum. Its height, 329 feet, may be compared with that of the Monument of London, which is only 202 feet. The base of its foundation is almost equal to the width of some of the old-fashioned double-setting retort-houses, and the base of the stack is equal to the area of many gasholders now in use for supplying small towns, &c.

In some rare instances, it becomes imperative to construct the stack at a distance from the retort-house, and to erect a subterranean flue from the one to the other. With this class of structure a difficulty in obtaining a current is generally experienced at the commencement of operations, arising from the mass of humidity, combined with the materials forming the flue, as well as that of the surrounding soil. Under such circumstances, a temporary fire is placed within the stack, which, deriving its air through the lateral flue, conveys away all the humidity, and, on the flue becoming warm, no further difficulty is experienced. It is, however, most desirable, in such a structure, to prevent the humidity from penetrating to the flue, which should be rendered on the exterior with Portland cement, and other precautions should be observed to avoid the formation of vapours, as well as the loss of heat by transmission to the soil.

Although we are aware that trials have been made, on a limited scale, of applying a forced current to the furnaces by means of fans, and that the system was patented some years ago by Messrs. George Lowe and J. Kirkham, we have never heard of it being practically adopted; and would venture to suggest that the system, during the depth of winter, if not at other times, might be applied with some prospects of success, when the strain upon the works, more particularly in the Metropolis, during about three weeks, is at the greatest. To explain our views, we assume that a certain amount of caloric is necessary to decompose a given quantity of coal, and expel its volatile constituents; and if this operation could be accomplished in, say, one-third of the usual time, even although there would be the extra expense for the motive power, we are of opinion that the advantage of not having to light extra beds would more than counter-balance the attendant expense. If we suppose that, in the usual way of working, the charges are of six hours duration, and that, by the increased amount of caloric obtained by the extra supply of atmospheric air, the heats are increased to such a degree as to work off the same quantity of coal in four hours, then the only precaution necessary would be to withdraw the coke at the proper moment, in order to prevent the generation of obnoxious gases. All that would be required to carry out this system would be a fan or blower, with pipes in connexion with the ash-pans of the furnaces, an arrangement which, with our modern appliances, is capable of being readily carried into operation.

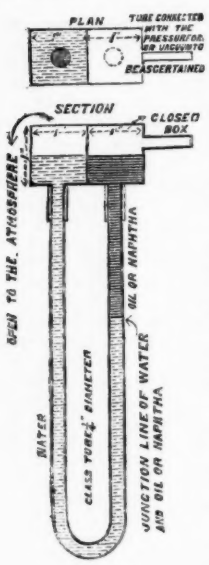

FIG. 5.

For appreciating the degree of exhaust in a chimney, or pressure, when required of great nicety, Dr. Ure invented an apparatus, of which we give an engraving, fig. 5, which represents a very beautiful instrument for that purpose. This instrument is of such extreme delicacy, that the force of the current of air supplying an Argand burner is indicated thereby. It consists of two vessels, each of about 1 inch square, one being open to the atmosphere, the other being closed at the top, and in communication with the chimney or apparatus where the pressure or exhaust is required to be ascertained. To these reservoirs is hermetically attached a bent glass tube of, say, one-twentieth of the area of each of the reservoirs. The tube is nearly filled with water and oil, the latter being indicated by the dark shade. On connecting the pipe of the closed box with the holder or vessel under pressure, say, of one-tenth, the line of separation of the oil and water would be depressed twenty times that amount; therefore every tenth pressure or exhaust would be represented as twenty-tenths in the glass tube, the index point being the junction of the water and oil. By augmenting the capacity of the reservoirs, the instrument can be rendered proportionately more sensitive; but without the liquid in the open box, the instrument would simply answer as an ordinary pressure-gauge, when the tube would have to be prolonged, according to the amount of pressure to which it had to be subjected.

(To be continued.)

A CHRISTMAS APPEAL.—We acknowledge, with thanks, the following additional contributions:—

Mr. J. Surl	£0	2	6
Mr. E. Padfield	1	1	0

Total amount received, £58 5s. 6d.

Communicated Articles.

THE LATE CITY OF LONDON GAS COMPANY.

In the number of the JOURNAL for the 21st of December, 1875, we gave a full-page engraving of the three-lift holder at the Blackfriars station of The Gaslight and Coke Company. These works, as we then stated, are in process of demolition, the site having been sold to the Corporation; and we may now add that the holder itself has almost disappeared. We believe it is to be re-erected elsewhere.

The history of the City of London Gaslight and Coke Company, to whom these works formerly belonged, contains many passages of interest, which, if space and opportunity were afforded, we should gladly record. It is known that the company were established at Blackfriars in 1815, by a private society of adventurers, who were first incorporated as a company by Parliament in May, 1817. The preamble of their Act recites that, "Whereas several Streets and Houses in the City of *London* are now lighted, to the Satisfaction and Advantage of the Inhabitants thereof, and the Benefit of the Public, with inflammable Air or Gas, produced from Coal and conveyed by means of Pipes: And whereas certain Persons who have Carried on Business under the Firm of 'The City of *London* Gas Light and Coke Partnership' have expended considerable Sums of Money in erecting Works and laying down Pipes in the City of *London* and have entered into Contracts with the Commissioners of Sewers Lamps and Pavements of the said City of *London* and several other Persons for lighting several Streets and public Places and also several private Houses with inflammable Air or Gas: And whereas the Persons carrying on the said Business are not able to raise sufficient Money among themselves for completing the Works necessary for supplying with such inflammable Air or Gas the Streets and Places which they have contracted or agreed to light as aforesaid." And it then proceeds to incorporate certain individuals named, and their successors, for a period of forty-six years from the date of the Act; and makes it "lawful for the said Company to make inflammable Air or Gas, and also Coke, Oil, Tar, Pitch, Asphaltum, Ammoniacal Liquor and any other Products to be obtained from the Manufacture of such Air or Gas and to sell and dispose of the same respectively in such manner as they shall think proper." By the second clause of the Act, the district of the company's supply was somewhat loosely defined; for, although the title of the company indicated a restricted area, they were authorized "to contract with the Commissioners of Sewers of the City of *London* and any other Commissioners, Trustees, Persons or Bodies, having the Controul, Direction or Management of the lighting of any of the Parishes or extra-Parochial Places in the said Cities of *London* and *Westminster* and the Borough of *Southwark* and the Liberties and Precincts thereof respectively, or any of them respectively, or adjacent thereto, or any Person, Bodies Politic, Corporation or Collegiate, Aggregate or Sole, willing to contract with the said Company for the lighting of any such Parishes or Places or any Streets, Roads, Highways, Lanes or Passages, or Manufactories, Shops, Warehouses or private Houses or Places of public Exhibition within the said Parishes or extra-Parochial Places respectively."

The capital authorized by this Act was £200,000. The company were prohibited from exercising any of their manufacturing or trading powers until £100,000 of this amount had been raised, and they were required, within five years, to subscribe the whole sum mentioned, in shares of £100 each. They were absolutely restrained from borrowing, or taking up by way of loan, any sum or sums of money whatsoever, and there were several other provisions in the Act which are unknown to modern legislation. The company were authorized to lay down mains with the assent of the local authorities, and a penalty of £20 was enacted for every square foot of pavement or ground broken up without such assent. They were empowered, "in such Cases as to them shall seem meet and convenient," to lay service-pipes and put up fittings, provided they employed manufacturers or dealers in the materials to be used to execute the same; but they were prohibited, under a penalty of £50, from selling any of the requisite materials, or employing any person in their pay or employ to do the work, "or derive any Emolument Advantage or Profit" therefrom. They were required, "upon due and reasonable Application" of the local authorities mentioned, "to furnish a sufficient Supply of inflammable Air for the Purposes of lighting the said Parish or Parishes or Part or Parts thereof, with a stronger and better Light, and at a cheaper and lower Price, all Expenses included, than such Parish or Parishes or Part or Parts of Parishes, could be supplied with if lighted in the usual Manner during the Existence of the Contract which they may enter into with the said Company;" provided they were not, by reason of such contract, to be compelled or required to expend any greater sum or sums of money than authorized by the Act, nor obliged to contract for a less period than 14 years, except at their own option. To this provision was added the following clause: "And be it further enacted, That every Contract or Agreement entered into by any Parish or Parishes, or Parts of Parishes with the said Company shall contain a Clause providing that the said Contract shall be null and void if at any Time the Price charged for inflammable Air used in lighting the Parish shall be greater than what at the time such Parish may be lighted for in the usual Manner with Oil for a period not less than Twelve Months by any Contractor offering due Security for the Performances of his Contract." These provisions contain all the conditions imposed upon the company in reference to the *vexata questio* of modern times—illuminating power and price.

Once in every half year, within a month from the general meeting of the company, the committee of management were required to transmit to the Secretary of State for the Home Department, a report, in writing,

signed by the chairman, deputy-chairman, or one of the members of the committee of management, of the state of the company and of their works, and the means possessed by them for securing the continuance of their operations, and such other matters relating to the works and proceedings of the company, as the Secretary of State from time to time might require, and the stations and works of the company were to be at all times open to the inspection of persons appointed by the Secretary of State. There being no general Act in existence at this period for regulating the proceedings of joint-stock undertakings, the sections of this special Act, dealing with the internal management of the company's affairs, were numerous, and very minute.

It has been stated already, that the Act of 1817 incorporated the company for a period of 46 years only, the reason for this limitation apparently resting upon the doubts, which at that period existed, as to the probable success of the new mode of lighting. The Chartered Gas Company, who had already obtained incorporation, possessed also a similar term of existence, an application for perpetual incorporation having been struck out of their bill on its third reading, through the opposition of the supporters of the whale oil trade. Two years afterwards, however, the Chartered Company were more successful, and in 1819 they were incorporated in perpetuity, but the City of London Company continued under their original Act until 1859.

These two companies had powers of trading over almost entirely the same districts, but in 1822, Sir William Congreve, an officer appointed by the Government to make certain inquiries respecting the gas supply of the Metropolis (several other companies having, in the meantime, been established in various parts of London), strongly urged upon the two City companies, the propriety of what have since been called "districting arrangements." The grounds upon which his recommendations rested, were not, however, those which subsequently prevailed with the companies generally—viz., the wastefulness of unrestricted competition, but the fear of explosions from the too large accumulation of gas in gasholders, there having been a report from the Royal Society, that any gasholder of a larger capacity than 20,000 cubic feet was dangerous. He did, however, press his suggestion upon them with the argument, that "the intended arrangement goes, in fact, to secure to you, unmolested, the full benefit of all you now possess, without the danger of being deprived of your customers, or by the exertions of successful rivals." But the City Gas Company were strenuously opposed to the scheme, and would have continued in their opposition, had not the Government in the following year threatened to introduce a bill, which was intended to have the districts of the different companies scheduled, with exclusive powers of lighting to each in the district so assigned to them. A voluntary arrangement was then made by which the City company were restricted to half of the City area, instead of supplying the whole as before, and a small district in Clerkenwell, while the other half of the City, the borough of Southwark, and the City of Westminster, were apportioned to the Chartered Company.

Although at the time referred to serious apprehensions were entertained respecting the danger of storing gas in large quantities, it does not seem that the holders of the City Company were of such a magnitude as to justify these fears. The cost of one of these holders erected in 1816, and called the "Good Intent," was only £737 4s. 9d. The late engineer of the company, Mr. Mann, states that he has often heard one of the old foremen declare, that when he first knew the works there were but two gasholders, "each about the size of his hat." When clearing the ground, a few years ago, for the first three-lift gasholder (a drawing of which we recently gave), two annular brick tanks were discovered, each of which could have contained a holder 20 feet in diameter and 10 feet deep. These probably were the two hats referred to.

In 1819 the company purchased some small gas-works at Aldgate, which they continued as an auxiliary station for some years, under the management of Mr. Gronout, and it is an interesting fact worthy of record, that at this station was erected one of Clegg's collapsible gasholders. They also in 1820 established a station at Millwall, "for the purpose of converting tar and ammoniacal liquor into pitch, essential oil, and other articles," according to the invention of Lord Dundonald, whose patent rights we believe they purchased.

The first engineer of the company was Mr. John Perks, the inventor and patentee of a system of retort-setting, and also of a condenser, which was erected at the works, and continued to be used with satisfaction up to 1853. Mr. Perks retained the management until about 1824, when he left England to undertake the erection of gas-works at Berlin, which city was first lighted with gas on Jan. 1, 1826. On the resignation of Mr. Perks, the appointment of engineer to the City of London Company was given to Mr. Gains, who had been transferred from Peto's old works in Goulston Square.

Mr. W. Mann, who is well known to many of the readers of the JOURNAL, first became connected with the company in 1840. He was appointed assistant engineer in 1847, and engineer-in-chief in 1852, an office which he continued to fill, with great satisfaction to the directors, until the recent amalgamation of their undertaking with the Chartered Company. The difficulties connected with the manufacture and purification of a large supply of gas on a limited site, and in the midst of a dense population, are necessarily great, and that the engineer of these works should have succeeded in conducting these operations with comparatively few, and these altogether trifling, complaints in the locality, reflects the highest credit upon his ability and untiring devotion to the duties of his office. When the company went to Parliament in 1859 for a renewal of their powers, a strong opposition was got up against them by the Corporation of London and their Commissioners of Sewers, who were desirous to have the works removed entirely from the City; and it was attempted to be shown by them that the works were an intolerable nuisance. But their case broke down entirely on the testimony of Benchers of the Inner Temple and inhabitants of the locality, who had resided within a few yards of the works for many years, and who voluntarily came forward to testify to the care with which the business of the company was conducted. At that time the river Thames flowing past the front of the works, and receiving, on the one side, the contents of the Fleet Ditch, and on the other the tide-locked sewer, which discharged into Whitefriars dock, created a nuisance far in excess of any that could arise from the emanations of well-regulated gas-works. Some years afterwards the river was embanked, and a railway constructed in the Embankment, between the river and these works, so that the company were deprived, to a large extent, of their water-way. The removal of the works, therefore, in consonance with the public feeling in favour of conducting such manufactures as much as possible outside urban districts, became desirable.

Down to the year 1848, the company enjoyed a tolerably peaceful and highly-prosperous career. In 1821 the price charged by them for gas was 15s. per 1000 cubic feet, and it was reduced from time to time, until, in 1848, it stood at 6s. For many years the company paid 10 per cent. dividends, and occasional bonuses, while they added £100,000 to their capital out of profits. But in 1848 began an opposition, instigated, or at least fostered, by the late Mr. C. Pearson, the City Solicitor, a man of considerable influence in Corporation "society." By him and his coadjutors, the cry of "cheap gas" was raised, and the Great Central Gas Consumers Company was established to supply 12-candle gas at 4s. Some persons have been wicked enough to trace a connexion between the formation of that company, in which Mr. Pearson and other members and officers of the Corporation were largely interested, and the appearance of complaints against the old company. We only remark the coincidence as singular. Into the history of the new company, and the changes they occasioned in the supply of gas to the City, it is not our intention to enter. The story has been often told, and is full of interest and instruction, but, in the present connexion, scarcely needs repeating. The City Company, throughout the long struggle, were ably championed by Mr. Robert A. Gray, who became their chairman in 1849, and continued to fill that office until the company were absorbed in the larger undertaking of the Chartered, upon the board of which he had a seat until recently.

PROSPECTIVE METROPOLITAN GAS LEGISLATION.

(BY A SHAREHOLDER.)

The bill promoted last year by the Metropolitan Board of Works has been again introduced, in the form in which it was passed by Mr. Forster's committee of last session; and it appears, by the report of the proceedings at a late meeting of the Chartered Company, that they have virtually agreed to its main provisions.

Inasmuch as this latter company have agreed to amalgamate with the Imperial Company, it may probably be taken for granted that both are acting in concert, and, if so, it may be fairly assumed, that the bill will be allowed to pass unopposed by those two bodies.

It is, perhaps, needless now to recapitulate the various objections, which were so forcibly urged against the bill, in the last session, by the Metropolitan Gas Companies; but, inasmuch as their arguments were unavailing, and that the bill was accepted by one of their number, and supported by the engineer of another, it is probable that the Chartered and Imperial Companies may have thought it hopeless to oppose the bill in the present session, and may have consented to accept it as the best means of obtaining the sanction of the Board of Trade to their proposed amalgamation.

What course may be adopted by the other companies I do not know, but, though the strength of their arguments against the injustice of the bill would remain the same, there can be no doubt that their opposition to it would be weakened by the defection of the most important of their former colleagues; nor can it be supposed that, if the bill (as is probable) be referred to the same committee as last year, they would stultify their former decision by its rejection in the present session.

The House of Lords, however, would still be open to the opponents, on appeal against the decision of the Commons, and it may be reasonably doubted whether that tribunal would lend its sanction to so manifestly unjust and dangerous a principle as that involved in the bill, whereby the security on which large sums of money have been invested, on the faith of Acts of Parliament deliberately passed, is compulsorily altered, without any charge of misfeasance against the investors. If such a precedent be once adopted by Parliament, it would obviously render unsafe every investment made under a similar security, and would practically be subversive of the doctrine laid down by the present Lord Cardwell, in his report on the City of London Gas Act of 1868.

It is not, however, my intention, in this letter, to recapitulate the many urgent arguments which might be used against the injustice of the proposed measure, if promoted antagonistically to the companies, but rather to point out how it may be rendered least objectionable to them, in the event of their consenting to its adoption.

It is urged by the promoters of the bill—and their views seem to have been acquiesced in by Mr. Forster's committee—that its provisions would be equally fair and advantageous, both to the public and to the companies; but, even if this be admitted, it is quite obvious that, in the interest of the latter, some means should be adopted for securing them against the repetition, by the Board of Works and the Corporation of London, of the course which they have more than once followed, of seeking to alter the legislation advocated by themselves, when it has resulted in advantage to the companies.

Thus, in 1867–8, they sought to alter the provisions of the Metropolis Gas Act of 1860, to which they were parties, on the ground

that, owing to the monopoly of supply which it had secured to the companies, they had been enabled to realize the maximum dividends which Parliament had conceded to them; but, at the same time, altogether ignoring the fact, that the realization of that rate of dividend was a condition precedent to any reduction in the price of the gas supplied by them to the public, which, owing to it, had been reduced since 1860, to no less an extent than £300,000 per annum!

Having succeeded in 1868-9 in reducing the initial price of the gas sold by the Chartered and Imperial Companies from 4s. 6d. to 3s. 9d. per 1000 feet, but with a provision for the increase of that price, if, through unavoidable causes arising from the increase in the cost of coals and other materials, they should be unable to earn their authorized dividends, they did not hesitate in 1875 to seek the repeal of this latter provision, as being too favourable to the companies, simply because it had enabled them to accomplish that which was its avowed intention, and on the faith of which some millions of money had been subscribed.

It must also be borne in mind, that after they had succeeded, in the last session, in inducing Mr. Forster's committee to repeal the foregoing legislation, and to substitute for it a sliding scale, under which every metropolitan gas company should be liable to a diminution of dividend, if they charged more than 3s. 9d. per 1000 feet for their gas, but should be entitled to a corresponding increase of dividend if they charged less, the Board of Works attempted to reduce that initial price in the case of the South Metropolitan Company, because they were already selling gas below that initial price, and would be, therefore, entitled to an increase of dividend.

It can scarcely, therefore, be doubted, judging from their antecedents, that this body would not be deterred, in a future session, from endeavouring to alter the legislation which they are now promoting, if perchance it should turn out to be advantageous to the companies; and although it may be difficult to ensure honesty by legislative enactment on the part of bodies who (acting, I presume, under a sense of divided responsibility) have shown themselves to be so little influenced by those principles of fairness which actuate individuals in their dealings with one another; still, no means should be left untried in order, if possible, to attain so desirable a result.

I would, therefore, venture to suggest that the committee on the bill should be urged to insert, in its preamble, some words denoting that it was promoted by the Board of Works, in the interest of the public, as the best means of ensuring to them a proper supply of gas on terms equally fair to them and to the companies supplying it, and with a view of finally settling those terms on an equitable basis.

Furthermore, the committee should be asked to amplify this preamble by a special report, referring to past legislation with regard to the Metropolitan Gas Companies, and to the importance of a final settlement of the terms upon which gas should be hereafter supplied by them.

In the face of such a preamble, and of such a report, I cannot help hoping, that, however much inclined the Board of Works might be to repeat their former tactics, they would feel it difficult to make the attempt, and would fail if they did so; and with such a protection, it might be well for the companies to accept of the proposed legislation, as a means of protecting themselves from the frequent attacks on their property, to which they have hitherto been subjected at the instance of the Board of Works and the Corporation of London.

True it is that, by the substitution of the proposed sliding scale for the parliamentary provisions under which the capitals of the gas companies have been subscribed, their security will be wholly altered, and that what has hitherto been considered as a tolerably safe investment, will be converted into a speculative one, dependent on the price of coal and other materials, over which the companies can, of course, exercise no control; but, on the other hand, if these do not rise much above their present price, it can hardly be doubted that, at the initial price of 3s. 9d. per 1000 feet (which is that fixed by the bill), most, if not all, of the companies could maintain their authorized dividends, and might possibly be able to lay by a moderate surplus towards the formation of a reserve, to protect themselves against future contingencies.

Thus, *if good faith be kept with them*, it appears to me that the bill may be the means not only of enabling the companies to maintain their present dividends, but also possibly, in the future, to increase them to a limited extent, by a reduction in favour of the public in the initial price of gas fixed by the bill.

It appears, by the last number of your JOURNAL, that a further requirement is now made by the Board of Trade, to the effect that all future shares to be created by the London Gas Companies shall be sold by public auction, and that the premiums (if any) arising on the sale shall be added to their capitals, without being entitled to any dividend. To such a proposal I cannot help thinking that the companies would be wise to consent.

Looking to the large amount of capital invested in their undertakings, their object, as it appears to me, should be rather to give increased security to that capital, than to seek to put in the pockets of their shareholders the premium to arise on the creation of new shares; and if this premium be added to their existing capitals, it becomes practically a gift to them of so much money, to be laid out productively in the extensions and consequent increase in the value of their undertakings. Surely this would be more advantageous to the shareholders than the suggestions contained in the bill lodged by the Chartered Company, that all future capital should be raised on debentures, thus establishing an unlimited capital, having priority over that held by them.

Should the foregoing concessions be made by *all* the Metropolitan Gas Companies, the bill of the Board of Works might be passed during the present session as an unopposed bill; but I would suggest that some further provision should be inserted in it, for protecting the companies from the very serious inconveniences to which some of them are at present exposed under the existing legislation in relation to the purification of their gas.

Under this legislation they are compelled to obey, at any cost, the orders of certain official Referees as to the elimination of sulphur and other impurities from their gas; and I am candidly informed that a compliance with those orders has involved one company alone in an expenditure of no less than £150,000 of capital, and an annual outlay of £10,000 in excess of their former expenditure, whilst they have been exposed to constant threats of litigation, owing to the nuisance occasioned by the mode of purification which they have been compelled to adopt, and which (if I am rightly informed) has resulted in little or no advantage to the public.

We have also seen, by a recent decision of the Court of Chancery, that the Chartered Company have been enjoined against the use of a process, patented by a late Referee, without the payment of a royalty, which, of course, would eventually have to be paid by the public, in the enhanced price of gas which it will occasion; but, inasmuch as the decision of the Vice-Chancellor will, no doubt, be appealed against, it is needless to allude to it further than as showing that, in the interests of the public, as well as of the companies, some revision of the existing legislation, in regard to the purification of the gas supplied by them, is most desirable, and that the opportunity afforded by the present bill of effecting that object should not be neglected.

Correspondence.

CHIMNEY SHAFTS OR STACKS.

SIR,—Your valuable "Treatise on the Science and Practice of the Manufacture of Coal Gas" has, in your last issue, reached the interesting subject of Chimney Shafts or Stacks. My experience having taught me to regard the question in rather a different light, I feel tempted to offer a few observations on the subject.

The general tenor of the chapter deprecates the use of dwarf, and advises the adoption of tall chimneys, on the ground that a chimney, 80 feet high, will give four times the ascending power or draught of one only 20 feet high.

It is because I know a good draught, and as much as is necessary, may be obtained from dwarf or short chimneys, that I disagree with the views you so clearly propound; and, as proof, I may mention that nearly all the stacks in the works with which I am connected are of the dwarf class, and many of them only tall enough to carry the products of combustion of the furnaces clear of the retort-house roof.

With the knowledge of this fact before us, I would ask, does the necessity exist to warrant the expenditure of capital for the construction of these adornments to a gas-work?

The effect produced by adding to the height of a chimney, as you observe—provided its area is sufficient for the work assigned to it—is to increase its draught. If a bench of settings is actually in need of more draught, rather than make the stack taller, I would suggest, construct a dwarf one at the farthest extremity of the main flue. By so doing, the action of the chimney would be distributed, and not concentrated in one point; in other words, there would be a more uniform draught over the whole bench, and the inconvenience of working with nearly closed dampers, in those beds nearest the shaft, would be avoided. I say inconvenience, for when the orifice of a flue is contracted, to a great extent, by a damper, the heat of a bed is apt to suffer, as the accumulation of corrosion on the edge of the damper and adjacent walls of the flue contracts the aperture.

The advantage of a valvular opening in communication with the atmosphere on a chimney might not be without use in the case, say, of 20 beds working into one shaft. If the draught was *good* when the full number of furnaces were in operation, during the summer months, when the majority of the beds were "let down," the draught would surely be *excessive;* and my impression is, that it would be a much safer way of regulating "the blast," than by depending alone upon the dampers to effect the alteration.

You say "the high heat or vivid combustion, so indispensable for working retorts and the proper carbonization of coal, can only be obtained by having the fuel concentrated within certain limits, and by a forced supply of atmospheric air or oxygen." This, I venture to suggest, is not correct. We do not require a forced supply of atmospheric air—at any rate, such a force as would be given by a tall chimney.

In the next paragraph to the one above quoted, you refer to a visit made to one of the best-managed metropolitan works, and there observed "an orifice—similar to, but larger than, a sight-hole—in the front of the bed, and just beneath the arch, in every one of the settings, from which the flames of the furnace issued;" and you were informed "that only by these holes could the proper heats be obtained." Now, I should like to ask, what necessity is there for the adoption of long chimneys at enormous cost, if proper heats could be obtained by the amount of draught inducted into a bed by a hole being open at the top of the setting, as above described? It occurs to me that it clearly shows a proper combustion of fuel, and consequent good heats, may be maintained without the aid, at any rate, of these long chimneys.

In the numerous settings under my care, I endeavour to restrict the forced supply of air as much as possible, and the way I am assisted in doing this is by the help of a hole in the front of each setting, near the top, of an area of about six square inches. By this means the dampers can be nicely adjusted, so as to cause the heated gases from the furnace to play gently about the crown of the arch before escaping into the damper-flue. If the damper is open, too much cold air will go in through the hole, and very soon be detected doing no good; if not sufficiently open, the heat of the furnace will come out to an extent which will be readily observed. These holes also enable me to detect when the furnaces are not doing their work effectively, and they afford capital opportunities of observing any leaks in the retorts. The heat of our furnaces throughout is perfect, and our consumption of fuel all that can be desired; and I have little doubt that the holes you observed in the front of the beds,

above referred to, were for the same purpose as I use them, and not for the purpose of giving additional draught to the furnace.

A damper attached to each chimney I consider an advantage, and as its cost is trifling, I should recommend its adoption, especially where frequent stoppages of carbonizing occur. By closing the damper in the shaft, you affect all the beds working therein, and it saves the trouble of disturbing the position of the damper in each setting.

London Gas-Works, Nine Elms, Feb. 11, 1876. JOHN METHVEN.

BURNER TESTINGS.

SIR,—In your issue of the 15th, we notice that Mr. M'Crae has called attention to our letter which appeared in your JOURNAL of the 8th inst., and he corrects an error which he had made, and which was published in the number of the 1st, to the effect that the consumption of Mr. Brönner's burner should have been 3·2 cubic feet, instead of 2·2 as reported, and which, if calculated to a consumption of 5 cubic feet, purported to produce 22 candles of light.

In making experiments with gas-burners, we find that the consumption and light are generally read correctly; and if any error arises, it is in making the calculations of those readings, rather than in the readings themselves. Assuming, therefore, 2·2 cubic feet consumption to have been correct, we considered that attention should be drawn to the error in calculation.

Accepting Mr. M'Crae's correction of 3·2, as the reading he obtained, we venture to say that, from some cause or other, he was not successful in developing the full quality of light from the Dundee gas.

In London we have not the opportunity of testing with gas of 28-candle power, which was the quality of the gas with which he experimented; we must, therefore, quote once more from the pamphlet of Dr. Wallace, whose position as gas examiner to the city of Glasgow renders his calculations of the highest value, and to which allusion was made in our last letter, and if Mr. M'Crae will refer thereto, he will find that with gas of 28-candle power, Brönner's burner, at a pressure of 1 inch, and at a consumption of 3·0 feet (which is the nearest consumption to Mr. M'Crae's 3·2 in the table), gives a light of 16·9, or 28·2 for 5 cubic feet. This, you will observe, is a very different result to that he has succeeded in obtaining, and is greatly in excess of any other burner with which he experimented.

155, *Cannon Street, Feb.* 17, 1876. H. GREENE AND SON.

ROWBOTTOM'S GAS STOKING MACHINE.

SIR,—Some years ago, in a certain county, it was customary, when a question was asked that required qualifying, to say to the querist, "Go to Halifax."

Well, I do not want to go to that ancient town, but rather wish to send a question there through the agency of your valuable JOURNAL, hoping to get an answer through the same.

In one of the drawings attached to Mr. Rowbottom's specification, there is shown a "stop-piece," with a long rod or handle, which is, I presume, intended to act as a piston within the "promover" or charge case, to compel the coals to flow out at the "hinged door" placed at the advance end of this implement, during the retrograde motion necessary for leaving the coals behind. Now, I should be glad to know by what ready means this "stop-piece is held fixed in a position, so that, on the return or back movement, the stop-piece holds the fuel which forces the door open" (the hinged door referred to).

Again, when this scoop or promover has left the charge within the retort, and is itself without the same, the stop-piece must be at the advance end of the promover or scoop. This not being its place, it must be drawn back all the length of the promover to be left in position at the rear end thereof, to form a barrier or abutment to the next charge.

If we suppose the promover to be 15 feet long, the handle or rod of the stop-piece must be more than that, and the stroke, or travel required to get from the advance end to its place at the rear of the promover, not less. By what contrivance is this readily accomplished? And, admitting the above dimensions, would not the length of the promover and the rod of the stop-piece make a total of over 30 feet?

Feb. 21, 1876. A LONDON MAN.

TRANSFER OF GAS-WORKS TO LOCAL AUTHORITIES.

SIR,—The purchase of gas undertakings by corporate bodies has of late been recognized as the only just and feasible plan of supplying gas in all respects satisfactory to the community.

The principle in itself is intricate, as affecting the commercial part, or the recognized means by which one section of individuals may deal with others in open competition. For instance, the purchase of the raw material; the selling of the ostensible manufactured articles, such as the coke, tar, and other products, whether in their own locality, or in others removed from the scene of operations.

The principles involved are—risks of various kinds, chances of more modern appliances in producing gaslight, the system of election accorded to a member of a corporate body, and the fair criticism which a corporation has, as against a company, with its risks as to the standard of purity of the gas manufactured, and general surveillance by independent parties. Mr. Livesey justly observes, that if corporations become gas manufacturers, they are at once exempt from searching chemical tests by independent persons, such as the Referees—except such reports as the servants of the Corporation may chose to make known.

The plan recognized of making a profit from the manufacture of gas, is most unfair, for by it a duplicate rate is enforced out of the consumer. If all persons—householders—had gas, and were lighted in proportion to the rates levied, as in water, the plan would be more fair in principle; but to exact, per 1000 cubic feet consumed, a certain fractional per centage, is hardly fair, side by side with the general taxation of this country. For instance, a shopkeeper, millowner, or proprietor of a theatre, may be rated directly at a figure the same as an owner of a mansion. The latter burns gas probably in the servants hall, whereas the shopkeeper, &c., has to consume it as a means to vend his goods, and in proportion to his consumption so does he fractionally relieve the owner of the mansion of his direct rate towards the improvement of the borough.

The only just principle is a co-operative one; that is, let every person subscribe his or her proportion to the gas consumed, a price per 1000 cubic feet in advance. Thus you make every consumer a proprietor; no deposit is unfairly exacted, and every one pays for what he burns; no bad debts are incurred, by reason of the amount being paid in advance, and all subscribe their proportion of capital. Gas is manufactured at cost price, and each consumer participates accordingly, Corporation and every one else. The advance in coal or other material is shared in equally by all parties; and the gas consumers, by their consumption, can vote, in proportion to gas consumed, for persons qualified to act as directors, the capital being provided for in the same proportion as the gas is consumed, or *vice versâ*. Thus, every inducement is held out to a householder to share his or her burden, as the gas is supplied at the cost price at which it is made; and no unequal deposit or complaint can be laid as to the exorbitant charges of a company or other body.

An Act of Parliament to break open the streets, or to assert the rights of the co-operative society, would be all that would be required, without factious opposition, as the Corporation or local body would be one of the consumers; and the mayor, by reason of his office, with three or four directors appointed by the consumers, could act in their capacity as the body for protecting the interests of the public. Collectors and bad debts would be thus dispensed with; also deposits and other items contingent on the present system, whether carried on by Corporations or companies.

D. B. S.

STATION-GOVERNORS.

SIR,—Will you kindly allow me to trouble you once, and only once, more on this subject? In reference to "T. B.'s" defence of what I suppose to be a fallacy, I would state, in support of my view of the case, that the pressure of the gas on the sloping surface of the cone urges it downward, in the same manner as a side-wind on the sails of a ship urges it forward; and, to show that the downward and upward forces are equal, suppose the cone at its lowest position, and at the instant of coming into action, and then imagine the cone to be completed into a cylinder by the surrounding gas. On this cylinder, by the laws of hydrostatics, the pressure in every direction will be equal, and therefore the downward and upward pressures will be equal. In every other position of the cone there will be a downward opposing the upward pressure, and disturbing the ratio between the upward pressure on the cone base and the roof of the holder.

W. JARVIS.

GOVERNORS TO METER-LAMPS.

SIR,—Notwithstanding Mr. Key's elaborate epistle of the 25th of January, the question still remains unanswered—viz., does a lamp-governor or regulator compensate for the reduction of pressure following the use of a meter? If, as Mr. Key says, the lamp-governor is only correct under the very hard lines he has drawn for it—viz., "that the burners used in all the lamps be the same and unalterable, not liable to get larger or smaller; that the pressure on each governor be the same"—if the above "constants" are attainable (which they cannot be), then, in myopinion, the diaphragm and valve, which constitute a governer, might be dispensed with as entirely useless; also the name "governor," or "regulator," as misleading.

I can only repeat that which I have proved by testings, that a good governor will make up for any pressure absorbed in the working of a meter, which pressure, in many cases, means 1-10th of an inch.

Redruth, Feb. 17, 1876. THOS. D. HALL.

RATEABLE DIVISION OF PROFITS.

SIR,—A gas company, in which I am rather interested, have lately obtained an Order from the Board of Trade, for an extension of capital, upon which a dividend of not more than 7 per cent. will be allowed to be paid. The original capital, which has paid a maximum dividend of 10 per cent., is all paid up, and we have called up a portion of the 7 per cent. stock. Some of us fear that our next division of profits will not enable us to pay 10 per cent. on the original, and 7 per cent. on the new stock; we are, therefore, anxious to know, and have your opinion, should the dividend come below the prescribed limit, in what way it should be divided—whether we should keep up the original to 10 per cent., and make the reduction, or pay the remainder on the 7 per cent.; and, if we did so, how would it be with regard to those who have purchased at a premium, and are possessors *only* of the 7 per cent. stock.

Remembering your kind courtesy in answering an inquiry of mine on a former occasion, I take the liberty of asking for a reply in your next issue, or as soon as convenient, signing myself, with your permission,

Feb. 12, 1876. METER.

[In recently granted Provisional Orders, there is a clause inserted to meet cases of this kind. The clause provides that, if the divisible profits are not sufficient to pay the prescribed dividends on both classes of shares, there shall be a rateable reduction on each. The Order referred to by our correspondent may, however, have been obtained before this clause was adopted.—ED. J. G. L.]

COST OF OBTAINING ACT OR PROVISIONAL ORDER.

SIR,—I am manager of a small work, the company's capital being only £3500, and I fear we may have to go to Parliament. Will you please let me know if we should have to raise more capital to pay the expenses of obtaining the Act, or if we should be allowed to borrow the money, and pay it off by yearly payments out of revenue? A reply in your next JOURNAL will oblige

A COUNTRY MANAGER.

[Your company had better obtain a Provisional Order for raising new capital. The expense of an Order will not exceed £100, which may be paid out of the amount raised.—ED. J. G. L.]

ILLEGAL DETENTION OF METERS.

SIR,—Would you kindly state, in your replies to "Notes and Queries," in the JOURNAL OF GAS LIGHTING, what course a gas company ought to take (who are without parliamentary powers) to recover a meter from a customer who refuses to deliver the said meter to the officers of the gas company? The supply of gas has been cut off outside, and the customer is now passing through the Court of Bankruptcy.

HAMILTON.

[Summon him for the illegal detention of an instrument lent on hire.—ED. J. G. L.]

REDUCTIONS IN THE PRICE OF GAS.—A reduction of 2d. per 1000 has been made at Ripley. The Peterborough Gas Company intend to make a reduction of 4d. per 1000 from the 1st of July next.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, FEB. 14.

The following bills were read the first time, and referred to the Examiners:—Llandudno Water and Gas, Maidenhead District Gas, Sutton Gas.

The following bills were read the first time, and ordered for second reading:—Blackrod Local Board, Braceborough Water, Edinburgh and District Water, Galashiels Municipal Extension, Police, and Water, Leigh and Hindley Local Boards, Llandudno Improvement.

TUESDAY, FEB. 15.

The following bills were read the first time, and referred to the Examiners:—Blackrod Gas, Bridgewater Water, Southwark and Vauxhall Water.

FRIDAY, FEB. 18.

The LORD CHANCELLOR acquainted the House that the further Standing Orders applicable to the Sutton Gas Bill have been complied with.

The following bills were read a second time:—Blackrod Local Board, Galashiels Municipal Extension, Police, and Water, Leigh and Hindley Local Boards, Llandudno Improvement.

HOUSE OF COMMONS.

MONDAY, FEB. 14.

The following bills were read the first time, and ordered for second reading:—Bristol United Gas, Huddersfield Water and Improvement, Leicester Improvement, Spennymoor and Tudhoe Gas, Stafford Borough Extension, Littlehampton Water, Southport Improvement, Dewsbury and Heckmondwike Water, Padiham and Hapton Local Board, Lancaster Water and Improvement, Burntisland Burgh, Paisley Water, Campbeltown Burgh and Harbour, Kildwick Parish Gas, Oldbury Local Board of Health, Dunfermline Water, Kirkcaldy Burgh and Harbour, Smethwick Local Board, Halifax Water and Gas Extension, Walsall Gas Purchase and Borough Extension, West Bromwich Improvement, Tipton Local Board, Ramsgate Local Board.

The following bills were read the first time, and referred to the Examiners:—Derby Gas, Folkestone Gas, Newcastle and Gateshead Water, Shepton Mallet Water, Colney Hatch Gas, Gaslight and Coke Company, Norwich (City) Water, Imperial Gas, Wakefield Water, Chesterfield Water and Gas, Rossendale Union Gas, South Metropolitan Gaslight and Coke, Horncastle Gas, Sevenoaks Gas, Southampton Gaslight and Coke, Whitehaven Harbour and Town Improvement, Cleveland Water, Stockton and Middlesbrough Water, Gorleston and Southtown Gas.

TUESDAY, FEB. 15.

METROPOLIS GAS COMPANIES BILL.—Report, that the Standing Orders have been complied with, presented. Bill to be read a second time upon Friday, Feb. 25.

The following bills were read the first time, and ordered for second reading:—Uppingham Water, South Hants Water, North-East Worcestershire Water.

The following bills were read the first time, and referred to the Examiners:—British Gaslight Company (Hull Station), Ramsgate Water, Thanet Gas, Tunbridge Wells Gas, Slaithwaite Gas, Colne Valley Gas, York New Water, Redcar and Coatham Gas.

THE PAROCHIAL SYSTEM IN THE METROPOLIS.

Sir W. FRASER moved the following resolution:—"That, in the opinion of this House, the parochial system is unsuitable and inadequate to the reasonable requirements of the inhabitants of the Metropolis; and that the subject deserves the best attention of Her Majesty's Government with a view to remove, by legislation, the great evils which at present exist." After reviewing the municipal history of London, from the grant of the first charter to the establishment of the Metropolitan Board of Works, he proceeded to speak of the inefficiency of the present system of local government in the Metropolis by vestries and the delegates of vestries in the districts outside of the City proper. Speaking of the duties of bodies, he pointed out how inefficiently they were performed, especially with reference to the supervision of the water supply and cleansing of the streets. He remarked that in the opinion of some vestrymen themselves, there were persons one would not wish to see there if London was to be well governed. Meetings of vestries were frequently held in public-houses, and only a small number of vestrymen attended. For instance, in the parish of St. James, out of 60 vestrymen, frequently only 25 attended a meeting of the vestry. The election of the vestrymen was conducted by a few individuals, and appeared to be a merely nominal proceeding. He thought it was well worth the attention of the Imperial Government to remove this state of things from London, which, as had been frequently said, contained more inhabitants than Scotland. Various schemes at different times had been proposed for the improvement of this state of things. One was to make one vast Corporation of the whole of the Metropolis, including about 4,000,000 souls. Another was to give to each of the parliamentary boroughs a municipal body. There were other schemes, but these, he thought, were the principal ones. It might be asked, if he thought things were so bad, why did he not bring in a bill to remedy them? But for any unofficial member of the House to carry a bill on that subject was quite impossible. It would require the whole power of a strong Government to accomplish it. He would, however, offer two very humble suggestions, the adoption of which would somewhat lessen the existing evils. The first was to diminish the number of the parochial districts; and the second, to have the central body elected, not by the vestries, but by the general body of the ratepayers. That question would, he hoped, before long receive the best consideration of the Government, so that the present generation might leave the local administration of London in a considerably better state than they had found it.

Mr. GOLDNEY opposed the motion. He said that for a long time he had taken an earnest interest in the gas and water supply of the Metropolis, and he was satisfied that every measure that was brought forward for the improvement of the condition and comfort of the inhabitants of the Metropolis would receive proper consideration from the Metropolitan Board, who had performed their duties in a very efficient manner, for the benefit of the Metropolis generally, especially as regarded the supply of gas.

Mr. LOCKE said he was astonished at the charming description given by the last speaker of the admirable way in which those who supplied the public with gas and water did their duty. If everything was really so satisfactory as the honourable gentleman said, the consumers must be very ungrateful, for they found considerable fault with those articles from time to time. He did not, however, quite understand what the honourable baronet (Sir W. Fraser) wished, for he had not pointed out any mode of setting things right if they were wrong. For himself, he did not say that the Metropolitan Board of Works had not performed their duty to a certain extent; but he thought that the Metropolis would be better governed if the City were extended so that one body should embrace the whole of London, and perform its duties without any clashing between one authority and another.

Sir A. LUSK maintained that the work of cleansing, lighting, &c., in the Metropolis was very well done indeed, considering the difficulties the vestries and district boards had to contend with. London was certainly better off in that way than Glasgow, Manchester, or Liverpool. It was easy to grumble about the way in which vestrymen and others did their work, but he should like to see those who found fault with them looking after the sweeping of the streets, the dust-carts, and nuisances themselves. Instead of attempting to upset the existing state of things, for which it would not be easy to devise a better, he hoped the honourable baronet would withdraw his motion, and leave the matter to the Government, who would, no doubt, do what was proper.

Sir J. HOGG confessed he had some difficulty in understanding what was meant by the parochial system of London, and he could not conceive how any one could fall into such a mistake as to speak of the local management of the Metropolis by that name. The honourable baronet had complained of paving, but, in attempting to make out a case against the authorities, he had contented himself with quoting from a report dated as far back as 1866, and relying upon the evidence of Mr. Beal, who had made himself notorious in connexion with the subject. As for the charge that some of the back streets of London were not kept in such admirable order as could be desired, it was no doubt true, and he (Sir J. Hogg) hoped the vestries concerned would do their best to improve matters. As to lighting, his honourable friend had some complaint to make, but he said he did not blame the vestries or district boards. Why, then, did he bring up the question at all? The quality of the gas was not under the control of those bodies, and all they could do was to endeavour to get it as good as possible. The Metropolitan Board, for their part, had done, and would do, their best, in conjunction with the City of London, to improve the gas supply. Last session he ventured to bring in three bills, backed by the Corporation of the City and the Metropolitan Board, to deal with this subject; but, unfortunately, he did not meet with as much support as he should have liked. Two of the bills had, therefore, to be given up; but one—the Regulations Bill—was read a second time, and went before a committee. The alterations then made in it had been accepted by the City Corporation and the Metropolitan Board, and were embodied in a bill which he should bring before the House on the earliest possible day. The water supply of London, which had been complained of, was at least as good, if not superior to that of many large cities and towns in England; and reports which had been made on the subject showed that, at all events, it was not the detestable compound it was said to be. His honourable friend had been informed that vestry elections were often held in public-houses. He never heard of elections being held in a public-house; they were always held in some large public building hired for the purpose. If proper persons were not always elected to the vestry, it was the fault of the residents in the district, the tradesmen and people of intelligence, who did not take the trouble to go and give the benefit of their experience. His honourable friend said, diminish the parochial districts, and let the central body be elected by the Metropolis at large, instead of by the vestries; but with regard to this, all he could say was that the members who came from the vestries and district boards had a large variety of useful experience which could be brought to bear from the moment of their election. Of course, it was for Her Majesty's Government to say whether a certain portion should be brought in by direct representation. His honourable friend said the City of London did not wish to join the Metropolitan Board on account of the debt; but he was not aware that the City had no debt. The debt of the Metropolitan Board was consolidated, and he believed through having one consolidated debt at 3½ per cent., instead of having debts for the different districts at different rates of interest, a great saving was effected to the people of London. His honourable friend had not pointed out how the evils of which he complained were to be ameliorated; but if they were pointed out they would be attended to with the greatest possible care by the vestries and the Metropolitan Board. Whatever powers were entrusted by Parliament to the Board would be exercised with moderation and discretion.

Mr. CROSS said he hoped the honourable baronet would excuse him if he did not enter into any lengthened statement on that occasion. He did not gather that it was the wish of the House now to discuss what was the best form of government for the whole of the Metropolis. The original system which was established had been very much changed by the legislation that had already taken place by the formation of district boards. No one could say that the government of the Metropolis might not be amended, though it was very much more difficult to say precisely what it was that should be done. He understood that they would, during this session, have several particular points bearing upon this matter brought before them. The great question of the water supply of the Metropolis was to be brought to their attention; there was notice to discuss the gas question; and the bill of the noble lord (Lord Elcho) was also again to be brought forward. When these schemes were put before the House in a practical shape, he should be perfectly prepared, on the part of the Government, to discuss them, to raise objections to them, or to say what he could in their favour, as the case might be. With all these particular schemes before them, he thought it would be better to postpone any lengthened discussion until other opportunities occurred. The honourable baronet might be quite sure, without formally passing his resolution, that the attention of the Government would be directed to the matter, and it was therefore hoped that he would not press his resolution.

Sir W. FRASER said it would have been much more satisfactory to have heard something approaching a promise, not only that the attention of the Government would be directed to this subject, but that the House might hope to have something approaching to a measure dealing with the grievance. As to what had fallen from Sir J. Hogg, he did not think there was much to argue. He regretted to hear expressions used which they were not accustomed to, such as "futile," applied to the remarks of a member. Although no doubt there was an assembly in Spring Gardens where language of this description was sometimes heard, he trusted it would not be imported into that House.

The motion was then withdrawn.

FRIDAY, FEB. 18.

Reports were presented that Standing Order No. 74 has been complied with in the cases of the following bills, which were ordered for second reading:—Chesterfield Water and Gas, Colney Hatch Gas, Derby Gas, Folkestone Gas, Gaslight and Coke Company, Norwich (City) Water, Shepton Mallet Water, Wakefield Water.

Report was presented, that Standing Order No. 75 has been complied with in the case of the Gorleston and Southtown Gas Bill, which was ordered for second reading.

On the motion of Sir CHARLES FORSTER, the Order of the 14th of February, that the Spennymoor and Tudhoe Gas and Bristol United Gas Bills be read a second time, was discharged, and the bills were referred to the Examiners.

The following resolution, reported from the Standing Orders Committee, was agreed to:—"That in the cases of the Stockton and Middlesbrough Corporations Water and Rosstrevor Improvement Bills the Standing Orders ought to be dispensed with, and the parties be permitted to proceed with their bills."

METROPOLIS GAS COMPANIES BILL.—Mr. A. W. YOUNG gave notice that on Monday, the 21st inst., he would ask the honourable member for Truro, whether, considering that the Metropolis Gas Companies Bill had only that day been printed and delivered to members, he would name some later day than the 25th inst. for its second reading, to enable the holders of gas property to meet and discuss its provisions before that event happens.

SATURDAY, FEB. 19.

A petition against the Colne Valley Gas Bill was presented from the Longwood Gas Company.

OTLEY WATER SUPPLY.—The Otley Local Board, on the 8th inst., adopted a scheme for supplying the town with water, at an estimated cost of £10,000, and determined to apply to the Local Government Board for the loan of that sum for 50 years.

Legal Intelligence.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

FRIDAY, FEB. 2.

(*Before Vice-Chancellor* BACON.)

MARTINEAU *v.* THE CORPORATION OF NORWICH.

Mr. KAY, Q.C., and Mr. FIELD appeared for the plaintiff; Mr. HEMMING, Q.C., and Mr. COZENS HARDY for the corporation.

This action was brought to obtain an injunction against the defendants, who are the Local Board of Health and Sanitary Authority of the City of Norwich, from allowing the percolation of sewage matter from their main sewer into the well of the plaintiff. The plaintiff in this case is a lady named Martineau, of Bracondale Lodge, a lady of considerable property in the city of Norwich, and Mr. Spanton, her tenant, the lessee of an inn called the "Pine Apple, or Drovers" Inn, with the stables, out-houses, &c., thereto belonging. The defendants were the Sanitary Authority for the Corporate District of the City of Norwich; and by the City of Norwich Act, 1867, the defendants, in their capacity of Sanitary Authority for the district, were empowered to execute certain works for the better sewering of the city of Norwich, and the applying of the sewage to the irrigation of their land, and for other purposes. The works authorized under the Act comprised, amongst others, a main sewer, commencing at or near to the point where the Town Close Road forms a junction with the road leading from Norwich to Ipswich, and terminating at the pumping-station, with all such incidental works and conveniences connected therewith, as the said Local Board should think fit. The main sewer referred to by the plaintiff is the outfall sewer of the city sewerage system, and it passes under the street in the hamlet of Trowse Millgate, in the front of the "Pine Apple" Inn, at a depth of about 40 feet below the surface. Previous to the execution of the works in front of the "Pine Apple" Inn, there was in the inn yard a well of good water, and the effect of the sewerage works was to drain the well and render it useless. The plaintiff, Miss Martineau, then caused a new well to be sunk in another part of the yard, and both the wells are situate at about 55 feet from the outfall sewer, and both were of the depth of 30 feet or thereabouts. When the outfall sewer was brought into use, the water in the well became foul, impregnated with sewage matter, and utterly unfit for use; and this, the plaintiff alleged, was caused by the escape of the sewage from the outfall sewer, which impregnated the soil surrounding the sewer, polluting the subsoil water, and the springs supplying the new well with water. It was for some time hoped that the fouling of the well would be only temporary; but, contrary to expectation, the state of the water had now become gradually worse, and the plaintiff had ascertained that there was no possibility of its becoming better, unless the faulty construction and defective condition of the said outfall were remedied. At the time of filing the original bill, in 1872, by the plaintiff, there was a sufficient depth of the water in the new well, but in May, 1873, the depth of water was reduced to two feet, and shortly afterwards the water supply had almost wholly ceased. The condition of the well now was, that it was either dry, or else that the water which it contained was so foul with sewage matter as to be entirely unfit for use. The plaintiff, Miss Martineau, had from time to time caused the water contained in the well to be analyzed, and the result of the analytical tests was that the fouling of the water was caused by the proximity of the sewage matter in large quantities. The bill stated that the plaintiff had applied to the corporation from time to time, reminding them of the defective condition of their outfall sewer, and urging on them to take such steps as might be necessary to prevent the pollution of the water of the new well by the escape of sewage from the outfall sewer; but the plaintiff charged that the defendants had neglected to comply with such request.

The learned counsel for the plaintiff read the correspondence which had taken place on the subject of the present complaint, and the affidavits filed in the suit. The first was that of Mr. Bailey Denton, who stated that he examined the well in question in 1873; and, after describing the state in which he found it, went on to say that he had also examined the main sewer of the corporation, and found it defective and leaky, and not water-tight, as it ought to have been. He had recommended, in a report to the corporation, that the sewer should be tubbed, but Sir Joseph Bazalgette had previously recommended the making of a new sewer. The next affidavit was that of the plaintiff, Mr Spanton, who recapitulated the main facts contained in the plaintiff's bill. Mr. Francis Sutton, analytical chemist, also filed an affidavit, giving the result of various analyses of water which he had taken from the plaintiff's well in the years 1872 and 1873. He was of opinion that the pollution caused arose from the escape of the sewage matter from the main sewer. Mr. Banham, a well-sinker, also filed an affidavit. He said that in 1871 he examined the old well, and found that the pumping and other works of the corporation had drawn off the water. In January, 1872, he constructed a new well. He stated that he had since examined the new well, and found the water in a very impure state. He attributed this to the escape of sewage matter from the main sewer. The latest affidavit was that filed by Mr. Beardmore, in reply to affidavits filed by the corporation. He gauged the sewage at the shaft near the plaintiff's premises, and found flowing there about 2000 gallons per minute; at the railway-shaft, about 170 feet distant, he found a flow of 4230 gallons; and he attributed the increase to water percolating through the sewer from the outside, as there was no intermediate drain. On the 15th of October, 1875, he took two other points, one 50 feet above, and the other 40 feet below the level, and found in that distance an increase of 45 gallons per minute, or 64,800 gallons in 24 hours.

The principal affidavits filed on behalf of the corporation were that of Mr. Thwaites, the corporation engineer, who stated that, with the exception of some unimportant leaks and "spurts," there was only one fissure below the water-line in the main sewer near the plaintiff's premises. He last inspected the sewer in May, 1875, and found the water which entered perfectly pure. He gave various reasons for disbelieving that sewage matter found its way into the well from the main sewer. He examined the new well in 1875; he found it dry at the bottom, and the air pure; he found water 7 or 8 inches below the bottom surface, and described it as clear and pure. His impression was that the well was polluted from surface drainage, and from cesspits in the yard belonging to the plaintiff's inn. The corporation, acting under the advice of Sir John Hawkshaw, were caulking the leaks and tubbing the sewer. If the plaintiff succeeded, he estimated the cost to the corporation at £25,000; and the new sewer system had already cost £130,000. There was also an affidavit filed by Mr. Morant, who ascribed the pollution to the same source. Mr. Boardman, the architect, denied that there had been any material subsidence of the plaintiff's premises since 1873. Mr. Poole, one of the overlookers of the sewerage work, also ascribed the pollution to surface drainage from the "Pine Apple" Inn yard.

Mr. HEMMING, for the defendants, said there were very few points on which there was any conflict. It was admitted, he said, that there was no leak of any consequence near the plaintiff's premises, and he submitted that it was impossible that sewage matter could be forced into the plaintiff's well, except on the rare occasions when there were thunderstorms or heavy showers of rain, and then the dilution would be so great that no possible harm could be done. The evidence went to show that there was continuous pollution going on, and this must be found in the surface drainage from cattle-pens, &c., and from the percolation from cesspits in the "Pine Apple" Inn yard. Mr. Beardmore's evidence, he submitted, must go for nothing. Having gone through the affidavits, the learned counsel submitted that the plaintiff had made out no case entitling her to an injunction, which would cost the corporation so large a sum as £25,000, and stated that the defendants had entered into a contract for rectifying the sewers throughout, such contract to be completed within twelve months. The work had been going on for a month or six weeks.

His LORDSHIP, without calling on the plaintiff's counsel to reply, said in his judgment the present case was practically without defence. Not only did the defendants know of the complaint, but they knew it was well founded, and they had taken the advice of competent persons, who had advised them that the sewers were defective, and the mode was pointed out by which the evil could be cured. But the bill having been filed in 1873, no steps were taken to apply a remedy, and no reasonable answer was given to the plaintiff, and she was therefore forced to bring on the case to a hearing. The evidence was clear. There had been no cross-examination of the plaintiff's witnesses, and they proved all the material facts. The evidence of Mr. Bailey Denton, Mr. Beardmore, and the well-sinker, was, in his opinion, most material. The only attempt to question the fact that the springs which supplied the well were polluted by filthy sewage matter, was by saying that there were cattle-pens and cesspits in the yard, and that the pollution arose from those sources. The evidence of Mr. Beardmore was conclusive against this theory, and his evidence must be taken as that of an impartial man well acquainted with the facts. The defendants admitted that their sewer was defective, and Sir John Hawkshaw and Sir Joseph Bazalgette had pointed this out. The evidence was positive that the water in the plaintiff's well was polluted by sewage matter from the main sewer; and there being no defence, the plaintiff was entitled to the injunction sought.

Injunction granted as prayed—to take effect in three months time, the corporation to pay costs.

COURT OF APPEAL FROM INFERIOR COURTS.—THURSDAY, FEB. 17.

(*Before Justices* GROVE *and* QUAIN.)

THE ST. HELEN'S CHEMICAL WORKS, *Appellants*, *v.* THE MAYOR AND CORPORATION OF ST. HELEN'S, *Respondents*.

Mr. WEBSTER appeared for the appellants; Mr. MANISTY, Q.C., and Mr. GULLY for the respondents.

This was an appeal from a decision of justices of St. Helen's, convicting the appellants under the 12th section of the Nuisances Removal Act, 1855. It appeared that sulphuretted hydrogen gas was emitted from the public sewers of St. Helen's into the streets, at a spot below the appellants works, in such quantities as to be dangerous to health. Two barrel drains connected the appellants works with the public sewer. From one of these drains a liquid containing muriatic acid was discharged into the sewer, and from the other a liquid containing sulphur was discharged. When these two liquids mixed, sulphuretted hydrogen gas was emitted. The sewer was not trapped, and it had not been flushed. It was contended on behalf of the appellants that their drains were not kept so as to be a nuisance, as it was not until the two liquids had become mingled in the sewer that any noxious consequence ensued, and it was also contended that as the respondents were bound by the St. Helen's Improvement Act to trap and flush the sewers, and as they had not done so, the nuisance was due to their default.

The COURT, however, were of opinion that there were no words in the Nuisances Removal Act to limit the word "drains" to the two barrel drains in question, or to prevent it applying to the part of the sewer where this gas was emitted, and that the fact that the respondents had omitted to trap the sewer was no answer to the case made against the appellants.

Judgment for the respondents.

QUEEN'S BENCH DIVISION.

(*Sittings at Nisi Prius at Guildhall, before the* LORD CHIEF JUSTICE *and a Special Jury.*)

THE EUPION GAS COMPANY.

PROSECUTION OF THE DIRECTORS.

The trial of this cause was resumed on the 14th inst., by Mr. POPE, who addressed the jury on behalf of the defendant Aspinall, and admitted that some ugly matters had been unearthed and exposed, but he asked them to presume that no fraud had been committed, and he submitted that the facts, as proved, did not sustain the indictment. None of the accused, he added, could go into the witness-box to give any explanation, and he asked that all doubtful matter should be regarded in their favour.

Mr. COLLINS, on behalf of Whyte, submitted that there was no evidence to show that he had taken any part in the fraud.

Mr. ORMEROD, on behalf of George Knocker, who was secretary to the company, argued that his client had only acted ministerially under the direction of the board, and that it had not been suggested that he was to share in any spoils.

On Tuesday, counsel for the defendants continued their addresses.

Mr. KEMP, on behalf of Fry, complained that the only two persons who could throw light on the proceedings (his client and Dr. Muir) had been precluded by the prosecution from making their statements.

The LORD CHIEF JUSTICE remarked that Fry should have been called as a witness, and not included in the indictment, and declared that it was the business of a prosecution to afford not only all the evidence that would convict, but also all that would acquit.

Mr. KEOGH, on behalf of Muir, argued that his client had only acted first in a silly way, and then in a rash one.

Serjeant BALLANTINE spoke in defence of Charles Knocker, and in the course of his remarks he said that in order to sustain a prosecution of this kind, concert must be proved between the accused. He should have to refer to the evidence of Professor Gamgee, who described himself as "a financial agent," whatever that might mean, but to his mind it meant nothing. People who had no respectability or calling of any kind in former days called themselves simply agents, but now they are "financial agents." Well, Mr. Gamgee had a profession, and had written books, but although he might manipulate a horse without doing much harm to the community, he could not so easily manipulate a case of this kind. He thought the jury would like to learn something more of Mr. Gamgee than that he was a veterinary surgeon. Mr. Gamgee had brought Mr. Hankey and Dr. Muir together, and Mr. Hankey's advice was practically this: "We must not be too quick; we must get great buyings in a small way, that will give us confidence on the Stock Exchange." If the theory of the prosecution was correct, Aspinall was to buy what Muir had to sell, and therefore the money would only go out of one conspirator's pocket into another; so that supposing they adhered to the splendid principle "honour among thieves," the brokers would still get their brokerage. He contended that so far from conspiring to defraud the brokers, he had written a letter in answer to Mr. Chapman's inquiries about Dr. Muir, on which no prudent man would have acted without further investigation; and had Mr. Chapman done this, the present prosecution would never have been necessary.

The court then adjourned until Thursday morning, when

The LORD CHIEF JUSTICE summed up the evidence. In doing so, he said this was a case calling for the most serious and deliberate attention, and at the same time for very nice judgment and discrimination—the matters ranging over so large a period. The matters to be considered were so complicated, the mass of evidence was so great, whether oral or written, and the points ascribed to the various persons included in this indictment varied so much, as to make the case one which called for most careful and deliberate consideration. The defendants were charged with conspiracy, and the law upon the subject had been already most correctly stated by the learned Solicitor-General in his speech for the prosecution. The charge of conspiracy necessarily implied that two or more persons had combined and confederated together to carry out a common

purpose. It was not enough that, in the course of such an inquiry as the present, it should be made to appear that this or that one of the persons charged had been guilty of improper or even of criminal conduct, and that was a matter which the jury must carefully bear in mind. It might be that, upon a review of the evidence, the jury might be of opinion that this or that one of the defendants had been guilty of serious and reprehensible misconduct—it might be that they might think this one had been guilty of misconduct of one kind, and that one of another thing, but they could not put the two things together, unless the acts had been done in furtherance of a common purpose. On the facts that had come before them, they might, if they drew the inference asked by the prosecution, be desirous, if they could, of convicting and bringing to deserved punishment any one of the defendants who they might think had been guilty of improper or criminal conduct; but they must take care they did not allow feelings of that kind, honestly entertained, to lead them astray, and carry them beyond the limits and landmarks which the law had carefuly laid down. The law of conspiracy was stringent and searching enough, even with the safeguards which were attached to it; and it would be intolerable if they did not allow the rules which had been laid down for their guidance for trials of this kind to operate for the benefit of those who were brought before a court charged with conspiracy—a form of proceeding too often resorted to, not for the purpose of vindicating public justice, but for the purpose of carrying out the views of private individuals as regarded their own individual interests. The charges contained in the indictment, which comprised very numerous counts, substantially resolved themselves into but two. In the first place, it was alleged that the defendants conspired together, being about to form, or having formed, a company, upon the pretence of working a certain patent in respect of a particular apparatus or invention, taking care to keep in their own hands all the shares which were allotted in that company, and so having in their own hands the entire command of the Stock Exchange, they meaning to take advantage of the rule on the Stock Exchange, that if the selling broker of the stock or shares could not deliver the stock or shares at the appointed time, the buyer was entitled to buy in at any price, no matter how extravagant, to avail themselves of this law, which no one who was a member of the Stock Exchange could venture to violate. They caused, through parties acting on their behalf, stock to be sold on the Stock Exchange, which they knew could not be had except of these conspirators, who then would be able to extort money from the selling brokers to any amount, however extravagant was the price of the shares they were bound to supply. If that charge was made out against the defendants, or any two or more of them, it most undoubtedly constituted a wicked and scandalous fraud; and the question they had to ask themselves was, whether it had been brought home as a matter of common intention or pretence to all or any two or more of the defendants. There was, however, a subordinate charge, not at all undeserving of serious reprehension, if it should be established, but which did not, in point of fraudulent intention, assume so grave an aspect as that to which he had just referred—that of combining to impose upon the Committee of the Stock Exchange by fraudulent allotments and pretensions as to capital, so as to induce the Committee of the Stock Exchange to grant a settling-day and allow a quotation, when the committee otherwise, in the protection of public interest and the integrity of the Stock Exchange, would not have done so. With regard to the second charge, he entertained grave doubts whether, as the offence was charged in the indictment, it was maintainable in point of law. But with that they need not trouble themselves, because, if necessary, he should reserve it for future consideration; and all they would have to do would be with the facts, and say if they considered or not the counts substantiated in point of fact. It was impossible to deal satisfactorily with either of the charges without going carefully into the history of the company, and tracing it through its different epochs, from the time when it was originally conceived, down to the time when it came to its final downfall. The hypothesis with regard to the company, put forward by the prosecution, was, that it was a more or less worthless affair; that the patents were more or less exhausted and worthless; that the company was a mere delusion, got up for the purpose of laying the foundation and providing means for a great fraud upon the selling brokers of the Stock Exchange, which the defendants contemplated. It became necessary to ask whether it would be just to say that Dr. Muir did not believe in the reality and valuable character of this invention. He laid out money, he employed engineers, he took premises, he tried to raise money on the invention, and it was only when that failed that he had recourse to a company in order to carry it on. If they thought the invention a good one, and, that but for the premature crushing of the company, it might have led to practical utility to the public, and a great advantage to those who formed the company, then they must decide in favour of the defendants. A company might be honestly formed, in the first instance, for the purpose of working a genuine and useful invention, and yet afterwards become perverted from its proper use, and turned into an engine and instrument of fraud. It was, therefore, important to ascertain, at starting, whether the formation of the company was an honest or dishonest undertaking. His lordship, in referring to the formation of the company, said it was a thing to be deplored, that gentlemen should lend their names and become directors, without having any interest in the concern. If companies were to be formed, and the public led to put faith in the names of gentlemen of position, respectability, and well-known honour, it was to be hoped that in future they would not lend their names in this way—that of having the qualification found for them, and not the real and substantial interest which the public were led to suppose. In this case the shares were all in the hands of a few of the directors, and when they came to consider the motives for forming this company, it did not appear to be one of those attempts made to swindle the public in applying for shares in a worthless concern, but one to defraud the selling brokers on the Stock Exchange. They had recourse to a clever financial contrivance to finance the company. It was fictitious as regarded the allotment of shares, and its capital was represented by the letters *nil*, as they had to borrow £2000 with which to pay current expenses. Mr. Charles Knocker was the representative of the bank to whom Dr. Muir was indebted. He was coaching Muir's son in mathematics, he was more or less interested in him, and it might be that he saw by this financial operation that Muir might be able to repay the bank, and that he might assist Dr. Muir in benefiting his position, and also assist his cousin in becoming secretary to the company, without it appearing to him that any latent fraud was to be carried out when this company was formed. His lordship having minutely gone through the evidence bearing on the financial operations of the company, said their next great act was when Aspinall got all the shares in his hand except three, and then went upon the market with them. The only person who could have given them information upon this point was Mr. Fry, who was a party to this indictment, and could not be called to give evidence. They were, therefore, asked to draw inferences hostile to the defendants, but they should always bear in mind that defendants could not defend themselves by their own evidence, given on oath; and so long as the English law remained as it was, and accused parties could not be heard on oath to vindicate their innocence, they must hold the prosecution strictly to everything alleged against the defendants, and not form hasty and rash inferences, where the circumstances could have been explained, consistently with the absence of guilt. From the evidence, Muir evidently did not want to merely make a profit on his shares, but also further profits by selling them two or three times over, and taking the differences, but always by selling his actual shares, delivering them, and buying them back again. He was one of those men who thought he had discovered a quick road to fortune, but which invariably leads a man into a quagmire. Sales were proceeded with, and purchasers were readily obtained, at premiums of varying amount. The learned judge having gone through the whole of the evidence, left these questions to the jury—first, did the defendants, or any two or more of them, engage in a combination to buy shares which they knew no one but themselves had to sell, with the view of defrauding the selling brokers by compelling them to obtain the shares from them at such exorbitant prices as they might choose to demand? Secondly, were any of them parties to a conspiracy to impose upon the Committee of the Stock Exchange, by fraudulent representations, as to the amount of the allotments and payments upon the shares, in order to induce the committee to grant a settlement-day?

The jury retired, and after an absence of an hour returned the following verdict:—"We consider that it has not been proved that any two of the defendants were engaged in a combination to sell shares on the Stock Exchange with the view of defrauding the brokers; but we consider that Joseph Aspinall, William Whyte, John Saunders Muir, and Charles Knocker were *Guilty* of conspiring to obtain a settlement-day on the Stock Exchange by false and fraudulent means."

The Lord Chief Justice said that would amount to a verdict against those four defendants on that charge, reserving the question of law; and it was a general verdict of "Not guilty" against Fry and G. Knocker.

The second indictment against the defendants, charging them, with the actual commission of the acts which they were charged with conspiring to do, was withdrawn, and the defendants were bound over to appear for judgment when called upon.

CROYDON COUNTY COURT.—Monday, Feb. 7.

(*Before Mr.* H. J. Stonor, *Judge.*)

ACTION AGAINST INCOMING TENANT FOR ARREARS OF GAS-RENT.

CRYSTAL PALACE DISTRICT GAS COMPANY *v.* SMITH.

This was an action to recover the sum of £20 0s. 6d. on account of gas supplied to a public-house of which the defendant is the landlord. The hearing of the case took place on the 3rd ult., and was reported in the Journal of the 11th of January. The learned judge then reserved his decision.

His Honour, in now giving judgment, said: In this case the plaintiffs sue the defendant for that the defendant, in consideration of the plaintiffs not cutting off the gas from the "Alma" Tavern, which the defendant was then about taking possession of as tenant, agreed with the plaintiffs to pay to them the amount due to them from Edward Piper, the then tenant of the "Alma" Tavern aforesaid, being £20 0s. 6d., and in consideration of such promise so made as aforesaid the plaintiffs did not cut off the gas. And for a second count the plaintiffs seek to recover the said sum of £20 0s. 6d. from the defendant, for money received or detained by the defendant for the use of the plaintiffs. And for a third count the plaintiffs seek to recover from the defendant the said sum of £20 0s. 6d. by reason of an arrangement made by and between the said Edward Piper and the defendant, that defendant should retain the said sum of £20 0s. 6d. out of moneys payable by the defendent to the said Edward Piper, and which the defendant agreed to do, but has not done. And for a further count the plaintiffs seek to recover the said sum of £20 0s. 6d. arrears for gas supplied by the plaintiffs to the said Edward Piper, by reason of the defendant having undertaken, with the said Edward Piper, the prior tenant of the premises, to which the gas owing for was supplied by the plaintiffs, to pay or exonerate him from payment of such arrears. The facts of the case are as follows:—Edward Piper, the tenant of the "Alma" Tavern, at Norwood, was indebted to the plaintiffs at the beginning of August last, in the sum of £14 16s. 5d. for one quarter's supply of gas up to the 6th of July; and also in a further sum for the current quarter. The plaintiffs collector and agent, Hunter, called on Piper for payment of the quarter actually due, which Piper did not pay him, but made a statement to him as to the same, and to a proposed change and transfer of the house. In consequence of such statement, Hunter called at the tavern on the 11th of August, which he understood was the day appointed for the transfer, between the hours of eleven and one, and found the defendant's wife there, and returned about half-past three, when he found the defendant there. The defendant stated that the house was about to be transferred that day to him at four o'clock. According to Hunter's evidence, he then said to the defendant: "I must cut off the gas, as Piper said he could not pay it." The defendant replied: "Do not cut it off, it will injure my business." Hunter said: "My instructions are to cut it off unless I obtain payment." The defendant said: "I will see you paid, I have got the money; I will see it paid when the business is transferred." Hunter said: "If you will promise me that the gas shall be paid for, I will leave it on," and he left it on. Hunter was there when the house was changed. The defendant and Piper were there, and Mr. Tighe, who represented the brewers. The defendant's agent, Leibran, was there reading out the inventory, and when he arrived at the rates the solicitor to Messrs. Holland, the distillers, said: "I will allow the rates, but not the gas." Hunter said: "I have left the gas on because Mr. Smith said he would see it paid." The defendant said: "It ought to be paid." Hunter said that he remained waiting for the money till seven, and then they refused to pay him the money. He could not cut the gas off after four o'clock. Hunter was accompanied by Robert Boocock, another servant of the plaintiffs. His evidence is important. He says: "I went with Hunter at 11.30 and again at 3.30. I was prepared to cut off the gas if the rates were not paid. I saw defendant at 3.40. I told him I had taken the register. He asked me what it amounted to. I replied that I made it £19 19s. 6d. altogether. He said: 'That is a tidy sum.' Hunter was there, and he talked to the defendant. I heard the defendant say: 'Do not cut off the gas, and I will see you paid; I have got the money in my pocket.' Hunter said to him: 'If you will see I am paid, I will not cut off the gas.' And the gas was not cut off. I afterwards found I had not charged enough for the meter-rent. It was £20 0s. 6d." The plaintiffs then called the defendant, who generally denied the truth of Hunter's evidence as to the interview on the 11th, and also deposed that three weeks before the transfer he called at the plaintiffs office, and told Hunter that he hoped he would get the arrears of gas from Piper before the change. He admitted, however, that he saw Hunter on the day of the change; that he told Hunter that he had the money to pay for the house, and that he supposed Hunter would get paid out of it, and that he told him not to cut the gas off. He also deposed that he had paid Piper £200 as deposit on the purchase, and that there remained a sum of £800 for him to pay, out of which eventually the brewers were paid a claim, on a bill of sale which they held, in full. £20 0s. 6d. was paid to Tighe, the brewer's agent, to meet the gas-rate, as afterwards more fully explained in the evidence of Mr. Leibran, the defendant's agent, and the balance was paid to Messrs. Holland, the distillers, in part discharge of their claim under a second bill of sale. The defendant further deposed that the sum of £20 0s. 6d. was so paid to Tighe in order that he might pay a portion only of the gas-rate; but in this, it will hereafter be seen, his evidence is at variance with that of his agent, Mr. Leibran. Hunter was then recalled, and deposed that the defendant, two or three days after the change, told him that Tighe had the money in his pocket to pay the gas company; also that at the time of the alleged agreement he knew the defendant to be a man of substance, and that, as a rule, the gas-rate was paid, on a transfer, by the incoming tenant, and this evidence was not contradicted. Mr. Leibran was then called, and deposed as follows:—"On the 11th of August I was present at the transfer of the tavern, as agent between vendor and purchaser. The collector of the brewery, Mr. Tighe, was there. Mr. Hunter was there and Mr. Piper. The arrears of gas-rate were mentioned. I made up the account. It was an insolvent estate. Mr. Holland's agent and solicitor objected to the gas company being paid in full. He thought that the debt ought to be compounded as well as their own. They talked about the gas being cut off. The

brewers were satisfied in full. I placed the sum of £20 0s. 6d., the gas-rate, in the hands of a third party, Mr. Tighe, whom I considered a disinterested party proper to hold the money. I heard no promise to pay." On cross-examination, this witness said: "I made up the account, and gave one to the vendor and one to the purchaser. The brewers received their claim in full—about £600. The brewers and distillers divided all the money besides the £20. The distillers received about £200. The money was handed to me to divide. I gave the £20 0s. 6d. to Mr. Tighe. Messrs. Holland's solicitors had protested against the payment of the rate, and the gas company had threatened to cut the gas off. The £20 0s. 6d. was paid to Mr. Tighe to pay the gas company or compound with them. The balance was paid to Messrs. Holland." Mr. Tighe, the collector to the brewers, was then called, and said: "I was present during the whole of the transfer. My firm was satisfied in full. I heard the discussion as to the arrears of gas-rate. Mr. Hunter wanted to be paid and Messrs. Holland's solicitor objected. There was a long discussion and Mr. Leibran suggested that a deposit should be paid into my hands until a composition could be made, and the £20 0s. 6d. was paid to me. Previously to the meeting ending Mr. Holland's solicitor served Piper with a notice in bankruptcy, thus prohibiting me parting with the money. I called at Mr. Hunter's and told him I could not part with the money until I had a proper authority to do so. Nothing was then said about a composition. A garnishee summons in the Queen's Bench was subsequently served on me by Messrs. Holland in respect of a debt due to them from Piper. I did not appear, and an order was made on me to pay the £20 0s. 6d. to Messrs. Holland, and I paid it over to them." The solicitor for the defendant was then called, and deposed that he had acted as solicitor for the defendant once before, and that he was Messrs. Holland's solicitor, and acted for them at the transfer. That he remembered Mr. Leibran's statement and the discussion as to the gas-rates, and then said that he did not see why the gas should be paid in full more than Messrs. Holland. That there was considerable discussion, and it was threatened to cut the gas off, and the money was paid to Mr. Tighe, to offer the gas company some money, and not to pay them in full. The witness served Piper with a notice in bankruptcy, and also obtained a garnishee order, as already stated by Mr. Tighe. In cross-examination he said: "I do not think I ever saw Tighe after the transfer. I took proceedings as to the attachment without knowing or inquiring whether a compromise had been come to." Piper was not called as a witness, and it was stated that he had absconded. Upon the first count and this evidence the following questions arise:—1. Did the defendant Smith agree with the witness Hunter to pay the sum of £20 0s. 6d. now sued for, or any part thereof, in respect of the gas due to the plaintiffs on the 11th of August last? 2. If so, was such agreement a guarantee for the payment of the same by Piper, or was it an original substantive contract by the defendant, irrespectively of Piper's liability? 3. There was no agreement at all, or if such agreement was a guarantee, and therefore void, because not in writing, by the 4th section of the Statute of Frauds, the defendant is entitled to a verdict on this count; but if there was an agreement, and it was an original substantive contract by the defendant to pay the above sum, or any part thereof, not as a guarantee for Piper, but irrespectively of his liability, then I think the plaintiffs are entitled to a verdict on this count. I do not think it necessary to go into the question of consideration further than to say, that the continuance of the supply of gas by the plaintiffs, under the circumstances of this case, appears to me clearly to have been a valuable consideration, sufficient to support this agreement if entered into, whatever may have been its nature. On the first question I am of opinion that the defendant did agree with Hunter to pay the sum of £19 19s. 6d. (which within half an hour of the transfer was stated to be due for gas-rates) in consideration of the plaintiffs agent not cutting off the gas, as he was entitled to do (10 Vict., c. 15. s. 16); and further that the defendant promised to pay the same out of the balance of the purchase moneys (£800) which at the time of the agreement was still in his hands; and I therefore do not believe that the defendant only held out to Hunter the expectation of part being paid out of such moneys on the transfer as he deposed, and with which I am convinced Hunter could not have been satisfied. The second question remains to be considered—viz., whether the defendant entered into such agreement as a surety for Piper by way of guarantee, or whether is was a distinct original substantive contract by the defendant to pay the same irrespectively of Piper's liability. From the remarkable case of *Mountstephen v. Lakeman*, in which the unanimous decision of the Queen's Bench was unanimously reversed by the Exchequer Chamber, and also by the House of Lords, and especially from the judgment of the late Mr. Justice Willes (L. R., 7 Q. B. 97), I think it may be fairly gathered (although not directly decided in the above case), that in order to create a guarantee the liability of a third party as a principal debtor must not only exist, but must also be contemplated and "intended" by the contracting parties at the time of entering into the contract as the "foundation" of the same. Indeed, if the liability of a third party, and the contingency of his paying the amount involved, be not contemplated by the parties to a contract, how can the promiser possibly be said to guarantee or promise in the words of the 4th section of the Statute of Frauds "to answer for the debt, default, or miscarriage of another?" "That statute," as Mr. Justice Blackburn observes in the case I have cited on the original hearing in the Queen's Bench, "must be taken to apply to any contract of suretyship where there is an intention of guaranteeing the payment of a debt of another, and to require a witness wherever the contract according to the intention of the parties is a contract of suretyship." (L. R., 5 Q. B., 619.) Now, in the present case, considering that Piper was known to the plaintiffs agent, Hunter, and to the defendant and his agent, Leibran, to be insolvent, that the defendant at the time of the contract made no reference to Piper's liability or the possibility of his paying the sum in question, but after ascertaining the exact amount due promised to pay the same upon the transfer (which was to take place in half an hour) out of moneys still in his possession, and eventually caused a portion of such moneys equal to the subsequently corrected amount of the rate to be appropriated out of such moneys to meet the same, I can feel no doubt that the parties to this agreement—viz., the defendant and the plaintiffs, by their agent, Hunter, in entering into it, did not contemplate or intend, but in fact wholly disregarded, the liability of Piper and the contingency of his paying the amount in question, that such liability was not the "foundation" of their contract, and that such contract was not according to the intention of the parties—a contract of "suretyship," but was a distinct original substantive contract by the defendant to pay the sum of £19 19s. 6d. (or perhaps the correct amount of the gas, whatever it might be) on the transfer, out of the moneys remaining in his hands, and consequently that the present is not the case of a guarantee, and does not fall within the 4th section of the Statute of Frauds. The conclusion to which I have arrived is, of course, based rather on the consideration of all the facts and circumstances of the case than upon the equivocal expressions which have been sworn to by Hunter and Boocock; but I think it right to say that there are many cases which show that those expressions are amply sufficient to support an original agreement if the facts of the case demand it. In addition to the case to which I have already referred, I beg also to refer to the cases of *Williams v. Leper* (2 Wilson, 308), *Andern v. Rowney* (5 Ex., 254), and the cases cited in note A, p. 97, of Mr. De Collyar's learned "Treatise on Guarantees," which has been of great service to me in the consideration of this case. I therefore find for the plaintiff on the first count for the sum of £19 19s. 6d. On the second and third counts I find for the defendant, as it is clear that the sum of £20 0s. 6d. was not paid to, or retained by, the defendant for the use of the plaintiff, nor was there any agreement in that behalf, as alleged, but was paid over by the defendant with the consent of Piper and Messrs. Holland to a third party, Tighe, to meet the plaintiffs claim; and, indeed, the money ought at the present moment to be in Tighe's hands, as I shall presently show. On the fourth count I feel some doubt; it involves two points. First, whether there was any express or implied agreement by the defendant with Piper to pay or exonerate him from payment of the arrears of gas, and upon the evidence I think, with some doubt, that a jury could not properly find that there was such an agreement; and secondly, whether, if such an agreement existed, it would, under the 39th section of the Gas-Works Clauses Amendment Act, 1871, confer a right of action on the plaintiffs against the defendant. The clause is as follows:—"39. In case any consumer of gas supplied by the undertakers leaves the premises where such gas has been supplied to him without paying the gas-rent or meter-rent due from him, the undertakers shall not be entitled to require from the next tenant of such premises the payment of the arrears left unpaid by the former tenant, unless such incoming tenant has undertaken with the former tenant to pay or exonerate him from payment of such arrears." The inclination of my opinion is, that a right of action would arise by implication to the undertakers, the plaintiffs in this case, if the incoming tenant, the defendant in this case, had given such an undertaking to the previous tenant; but as I think—although with some doubts—that the defendant cannot properly be held to have given any such undertaking to Piper, this point becomes immaterial for the present, and I have not fully considered it. I, therefore, find for the defendant also upon this count. With regard to the payment of £20 0s. 6d. to Tighe, I think it right to state that I feel no doubt that Mr. Leibran's is the correct explanation of it—viz., that Tighe was to pay or compound the debt, or, in other words, that if the company would take less, well and good; if not, he was to pay the whole in discharge of the defendant's liability; else why was the whole amount of £20 0s. 6d. paid to him instead of £10, or any other dividend which was the amount of composition authorized? I must also observe that the attachment against Tighe was clearly erroneous, as the £20 0s. 6d. in his hands was not the money of Piper, but of the defendant Smith, paid by him, with the sanction, indeed, of Piper and Messrs. Holland, to Tighe for a specific purpose, and that Tighe ought certainly to have opposed the order. I also think that the whole proceedings as to the payment of £20 0s. 6d. to Tighe, the notice in bankruptcy, and the attachment, have very much the appearance of a contrivance to deprive the gas company of the money which the defendant Smith had agreed to pay them for not cutting off the gas, and which had actually been set apart to meet the same. I therefore find for the plaintiff on the first count for £19 19s. 6d., and for the defendant on the three remaining counts. If the defendant appeals against my finding on the first count, I hope that the plaintiffs will also test the correctness of my finding on the last count.

Verdict for plaintiff for £19 19s. 6d., with costs on the higher scale.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

PADDINGTON VESTRY.—At the meeting on the 15th inst., it was stated that a communication had been received from the Board of Trade, to the effect that the Imperial Gas Company had applied for a reconsideration of the decision of the Referees as to the mode of ascertaining the consumption of gas by the public lamps in the parish, and that the Board had instructed the Referees to proceed at once to make a further inquiry on the subject. A resolution was adopted by the vestry appointing the chairman of the Gas Committee and the vestry-clerk to represent the vestry before the Referees.

CAMBERWELL VESTRY.—At the meeting on the 16th inst., a petition, which had been drawn up by the clerk, in respect to the bill of the South Metropolitan Gas Company, was read and approved, and the seal of the vestry affixed to the same. The object of presenting such a petition is to obtain a *locus standi*, so that the interests of the parish may be looked after in regard to this particular bill. Mr. Dresser Rogers said he believed the bill would be opposed by the Metropolitan Board of Works. If the Gas Regulation Bill of the Metropolitan Board of Works, which it was understood would received the support of the Government, did not pass, and this bill of the South Metropolitan Company did pass, certainly this parish would be largely prejudiced by it, more particularly by the amalgamation clauses. It was of the utmost importance, therefore, to this parish that the bill should be opposed in order to obtain a *locus standi* in the House. Personally, he should not be surprised if even now, by some jugglery in the House of Commons, the Gas Regulation Bill failed to become law, and this notwithstanding the great expense the Metropolitan Board of Works had been at in promoting it in the interests of the consumers.

METROPOLIS WATER SUPPLY.

METROPOLITAN BOARD OF WORKS.—At the meeting on Friday last a report was submitted by the Parliamentary Committee, in which they stated that they had considered the reference made to them by the Board on the subject of the water supply of the Metropolis, and they were of opinion that the most effective mode of dealing with the question would be to obtain power to carry out the recommendation of the Royal Commission of 1869, that the water should be in the hands of the responsible public authorities. There was a recommendation in the report, that in the event of the Board concurring in this opinion, the matter should be referred back to the committee, with instructions to confer with a committee of the Corporation of London, and to ascertain from the Home Secretary whether the Government would support a measure for the purpose, if it were introduced by the Board and the Corporation. On the suggestion of Mr. Roche, the consideration of the report was adjourned for a week.

Major Bolton reports that the water in the river Thames at Hampton, Molesey, and Sunbury (where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, and East London Companies are situated), was in a dirty and turbid state during the whole of the month of January. The highest flood state of the river was 2 feet 1 inch above the (6 feet) summer level, and the lowest was 5 inches above summer level. At Seething Wells, Kingston, the condition of the water in the river was also bad. The highest state of the flood at this place was 2 feet 9 inches, and the lowest 3 inches above summer level. The highest temperature of the water was 44°, and the lowest 34°; while the highest temperature of the air at the same place was 47°, and the lowest 25°. These observations were made daily at 9 a.m. The rainfall for the month was 0·78 inches.

NEWPORT (MON.) GAS COMPANY.—The half-yearly meeting was held on the 14th inst.—Mr. T. Gratrex in the chair—when the following report was presented:—"The statement of accounts for the half year shows that the balance of net earnings was considerably less than in the corresponding period of 1874, being only £1815 7s. 8d., out of which the directors recommend the payment of the usual dividends. This will absorb the sum of £1657 13s. 10d., leaving a balance of £157 13s. 10d. to be carried forward. To give a more ample and equal supply of gas to the Alexandra Dock district, it had been decided to lay down a separate 18-inch main from the works to the Cardiff Road. Of this the portion to the top of Llanarth Street has been completed, and found to answer the purpose intended satisfactorily. The remainder of the work will be proceeded with as soon as the weather will permit. The new gasholder is completed, and will give a great increase of storage power. Further works and rearrangement of the present premises for the increased manufacture of gas will shortly be commenced." The report was adopted, and the dividends declared as recommended by the directors.

SOUTH METROPOLITAN GASLIGHT AND COKE COMPANY.

An Extraordinary Meeting of the Proprietors of this Company was held at the London Tavern on Monday, Feb. 14, for the purpose of considering a bill now before Parliament, intituled "A Bill to grant further powers to the South Metropolitan Gaslight and Coke Company." BERIAH DREW, Esq., presided.

The SECRETARY (Mr. G. Livesey) read the notice convening the meeting, and also the heads of the bill, as deposited.

The CHAIRMAN briefly moved—"That the bill now read to this meeting be approved, subject to such alterations as the directors may deem expedient to adopt."

Captain HEATHORN seconded the motion.

Mr. PAULL said he should like to ask a question with regard to clause 14 of the bill, which related to the price of gas. It said, "The standard price to be charged by the company, for gas supplied by them shall be 3s. 9d. per 1000 cubic feet." Did that mean that the company would, from the time the bill passed, advance the price from the 3s., now charged, to 3s. 9d.?

The CHAIRMAN: No, it simply gives us power to do so; it does not say we are to do it.

The SECRETARY: Our present standard is 3s. 6d. We have the power to charge that, but we do not.

Mr. JULIAN HILL: And we are going to give an illuminating power of two candles more than required by our present Act, which is estimated as an equivalent to the advance of 3d. in the standard price.

Mr. PAULL: Practically, you are giving 16-candle gas now.

The SECRETARY: This clause is copied exactly from the Regulations Bill.

Mr. BROUGHTON: What is the nature of the bill promoted this session by the Metropolitan Board of Works?

The SECRETARY: It is not known yet. The bill has not been printed.

Mr. BROUGHTON: It may be of such a character as materially to alter the policy of this company.

A PROPRIETOR: From a report I saw in one of the newspapers, the bill of the board will be in every particular the same as last year's.

Mr. BROUGHTON: I think it will be necessary to be informed of the nature of that bill before we take any steps.

Mr. JULIAN HILL: We are obliged to take steps and deposit our bill, which is a private bill, before the bill of the Board, which is a public bill, is brought in. We have deposited ours in the event of theirs not being proceeded with. We shall decidedly keep that bill in view when we can get a copy of it.

A PROPRIETOR: What is the dividend proposed upon the new capital?

The SECRETARY: That is left open; it is not stated in the bill.

The motion was put and carried unanimously.

Mr. PAULL proposed a vote of thanks to the chairman and directors for the care with which they had prepared the bill, and for their continued attention to the general interests of the company.

Colonel EWART seconded the motion, which was put and carried.

A PROPRIETOR: Do the Corporation of the City of London propose to bring in a bill this year?

The SECRETARY: The Corporation have nothing to do with us.

Mr. JULIAN HILL: Our operations are confined to the other side of the river, and we are not within the precincts of the City of London; therefore, whatever the Corporation may do will not affect us, any more than it will Manchester or Liverpool.

The CHAIRMAN acknowledged the vote of thanks passed to him and his colleagues, and the proceedings terminated.

BURY ST. EDMUND'S GAS COMPANY.

The Half-Yearly Meeting of Shareholders was held on the 11th inst.—Mr. H. TURNER in the chair.

The SECRETARY (Mr. Salmon) read the following report of the directors:—

For many past half years the directors have had nothing of a special description to report to the shareholders, their reports have been exclusively limited to the agreeable announcement of the payment of the maximum dividends allowed by the company's Acts. The success of the company still continues, and the time has now arrived when, to maintain its position, an expenditure of something like £6000 has become absolutely necessary, and cannot with safety be any longer delayed. This necessity can be easily understood when it is mentioned that in the year 1864, 19,047,000 cubic feet of gas were made, while in the year just ended 29,933,500 were made. It will thus appear that what was sufficient for the purpose of the business of the company in the year 1864 would be totally insufficient in the year 1876. There is storeage only for 100,000 cubic feet of gas, while some days as much as 170,000 feet have to be made.

From this it will be seen under what disadvantages the directors have had to work during the winter months. To work economically, and to be always prepared with an adequate supply of gas, the directors ought to have a storeage capacity of at least a day and a half of the largest daily make. To obtain this will entail the necessity of erecting a new gasholder, sufficient in size to hold 150,000 cubic feet of gas. Fortunately some few years since the directors purchased a piece of land on the east side of the works, which in every respect is admirably adapted for the purpose, and upon which it is proposed to erect the new gasholder.

The purifying and condensing power has for the reason already stated become insufficient, and must be enlarged. The present chimney has become unsafe, and must be taken down. This is not to be regretted as its removal will enable another set of retorts to be obtained, with which, and the present supply, it is hoped to make the retort-house sufficient for its purpose, at least for some years to come. Before another winter the directors may have a new and heavy demand upon them for gas by the military depôt about being erected in this town.

The directors trust that they have thus satisfied you that they are not proposing this large outlay before it has become absolutely essential. The sum, as it is wanted, it is proposed to raise by calls on the new shares upon which there is still unpaid £8100. These calls will be made in sums of £1 each, the first in the month of May, the second in the month of July, and the last of them in the month of October or November next.

The directors trust that the shareholders will not find these calls, extending over so long a time, attended with inconvenience; at least they must, the directors feel assured, find them a most beneficial investment of their money. The directors have no reason to doubt that the rate of dividend hitherto paid will be maintained, because they believe that the proposed expenditure will result in more economical working and a larger and better supply of gas to our customers. The directors have desired thus to place the whole matter before you that you may attend the approaching meeting fully prepared to discuss with them the important matter now brought before you.

The directors will recommend the payment of the usual dividend for the past half year of 10s. per share on the old capital, and 4s. 1d. on the new capital, both free of income-tax.

The CHAIRMAN briefly moved the adoption of the report, which was seconded by Mr. G THOMPSON.

Mr. HOOPER said he presumed the laying out of £6000 would cost the company 7½ per cent., which would be £450 per annum. He merely wanted to ask how they expected to get that returned. The anticipated demand for the military depôt would not exceed £100 or £150 a year, and he wished to know where the remaining £300 of income were to come from. Being an auditor, and having some little acquaintance with the number of additional gas consumers during the last 12 months, he did not see there was any fresh large consumers—the majority of them paid about 10s. a quarter. The question was, whether they would advance the price of gas to secure the additional income, or whether the company would have to lose £300 a year.

The CHAIRMAN said he thought Mr. Hooper's question was partly answered by the report, where it was stated that the proposed addition to the works would tend to the economical working of the concern. He believed they would save a great deal by having stock in hand, and they hoped, besides, for a large increased consumption. During one week at Christmas, there would have been much more gas burnt if they could have sent it into the town.

The SECRETARY said an increase in the price of gas had never entered the heads of the directors. Considering the inland position of Bury, the consumers had been very fairly dealt with. They had never been charged the maximum, and the effort on the part of the directors had been to see how early they could reduce the price. With regard to the increase of consumption, the report showed that there had been an increase of a million feet per year for the last 11 years; and there was very little doubt that this increase would continue, when they got the means of supplying the heavy demand that was likely to come upon them. They all knew that the complaints that had been made had not been altogether groundless, but they had given the public all the gas that could be sent out from the works. The complaints had been almost entirely confined to want of gas, and he believed that, when the alterations now contemplated had been carried out, there would not be an atom of complaint either as to the quality or quantity of the gas. He believed that, if the consumers looked to their fittings, they would find that many of the complaints were from local causes. In the report the directors had shadowed forth all that it was their duty to do—that the dividend would not be altered. In addition to the reasons already mentioned upon which they based this hope, he might mention that they had been for some time investing in the reserve-fund; and if it became necessary, for the purpose of keeping up the dividends, they might cease to make any addition to that fund for a time. The directors had at first been a little surprised at the largeness of the outlay, but gentlemen engaged in trade knew they could not compare wages and materials now with what they were at the time when the last tank was put down; and, until the matter came before them in figures and details, it had been sufficiently through the minds of the directors as to what the outlay would be. He thought, however, they would be of opinion that the directors were but right in doing everything perfectly and well. They ought not to do what would last only three or four years—they were bound to look far beyond that, and what they were now proposing would be an outlay for a lifetime. Perhaps it was the only work they would have coming upon them except some additions to the retort-house. If they continued to give their confidence to the directors, he believed they would have no cause to regret either the amount of the outlay or the result of it. The cost might exceed by a few hundreds the £6000, but they must give the directors a *carte blanche* for that. They had given the nearest and best estimate they could, and had kept back nothing. They had given full information in the report, wishing that the shareholders might come prepared to discuss the question, and nothing would please the directors more than to hear a free expression of opinion on the part of their constituents. If they approved of the proposed step, they would send the directors on their way rejoicing.

Mr. MEAD said he had every confidence in the directors, and he thought what was proposed was the best thing to do. He did not believe in working a concern in a niggardly manner, and he was sure the contemplated works would give satisfaction, especially to the consumers.

Mr. SMITHYES was quite certain that if there was more gas it would be consumed.

The SECRETARY said he believed similar complaints were being made in most of the towns in the kingdom. Almost everywhere companies were taking more capital and increasing their works.

Mr. HOOPER did not think they could expect the same increase of consumption in the next ten years that they had had in the last, as all the principal establishments were now on the list of consumers; and he asked whether they could not do what they wanted for something like half the amount it was proposed to expend. Why should they provide for a generation to come?

The SECRETARY said the new gasholder alone would cost half the amount, so they could not do the work for half, as Mr. Hooper had suggested. As to the probable increase, he said the military depôt would take a million feet a year. They had a saving of a million feet through the alterations that had been made in the mains, and when all the mains were relaid they expected to save another million. This showed itself in a large decrease in the consumption of coal, and he was certain they might calculate upon a saving of £100 a year from that source.

Mr. RIDLEY thought the questions Mr. Hooper had asked were just such as might fairly arise in the mind of any gentleman interested in the company. He confessed that the first thought that occurred to his mind was, "How shall we get on for the £450 that is necessary as an addition to the income?" Having given some attention to the matter, he did not know that there would not be some little stress in meeting this increased payment of dividends; but he really thought there was very good ground for hope, and even confidence, that the proposed expenditure would result satisfactorily. The consumption would increase, gas would be produced at less cost, and the saving resulting from the improvement of the mains would be so evident, that they might fairly hope that the necessary increase in income would be provided. He thought they might say with certainty that they would not increase the price of gas. They might not be able for a time to add to the reserve-fund, and possibly they might have to fall back upon that fund for a year or two, but beyond that he did not think there would be any difficulty in providing payment of the dividends.

The SECRETARY said perhaps they had not all noticed the figures in the balance-sheet. They were going to pay £960 10s. in dividend, but that left £2077 to carry forward. That sum had not all been earned this half year. They began the year just ended with something like £1600 in hand, and at the end of June they were not so well off by £800. The first half of the year, however, was always the worst for them, and if they took the year they found that the balance of £1600 had been raised to £2077. Therefore they had already an income nearly sufficient to pay the dividend on the new capital, after having invested £200 in the reserve-fund. If the past year were taken as a guide, they were able to pay all the dividends, and still have a balance of £150 left.

Mr. SMITHYES thought the reserve-fund ought to be kept up if possible, as it gave stability to the concern.

Mr. HOOPER said when he first came to Bury the company were putting down a new tank, and there was great difficulty in dealing with the shifting sand. He wished to know whether on the present occasion they or the contractor would take the responsibility of that.

The CHAIRMAN said it would, of course, be taken by the contractor. He had been spoken to, on the subject of the proposed alterations, by two or three shareholders, who seemed to mix up capital with revenue. Since he had the honour of being chairman he had always said the works were in excellent order. So they were now, but what it was proposed to do was not repairs, but an addition to the works. They had never applied capital to repairs, knowing that when things were worn out it was their duty to replace them. The shareholders would find that the works did not require anything in the way of repairs, except the chimney, which would have to be paid for out of revenue. The works had been kept in excellent repair for the last three or four years.

The SECRETARY: And the chimney has done its work well, having been finished on the 1st of January, 1834.

The motion for the adoption of the report was then carried unanimously.

The retiring directors and auditor were severally re-elected, and a vote of thanks was given to the board for their services.

The CHAIRMAN acknowledged the compliment, and proposed a vote to the secretary, who, he said, was always at his post, and was very anxious to promote the interests of the company in every way in his power. He would also include in the vote of thanks the manager. Though he was young, the directors felt confident that they had the right man; and they hoped he would be able, when the proposed works were completed, to give satisfaction to the directors, and also to the public at large.

Mr. CATLIN seconded the motion, which was carried.

The SECRETARY said it was very gratifying to him, as an old servant, to receive the thanks of that large meeting, especially when such a considerable amount of money was asked for; and he looked upon it as an earnest of their satisfaction. The gas-works were rather a pet place of his. He had grown old in the service of the company, and he hoped to be with them as long as he was of any use to them. When he was of no use he would retire.

Mr. M'CRAE (the manager) also returned thanks, and said he hoped to maintain the good opinion of the company, and it was a great satisfaction to him that the proposal for an extension of the works had been accepted by them. It showed that the shareholders had confidence in the directors, and in himself in the background.

A vote of thanks to the auditors, accompanied by an expression of regret that one of them (Mr. Clay) was too unwell to be present, brought the proceedings to a close.

LIVERPOOL UNITED GAS COMPANY.

The Half-Yearly General Meeting of the Proprietors of this Company was held on the 15th inst.—Mr. JAMES LISTER presiding.

The SECRETARY (Mr. P. F. Garnett) read the directors report, as follows:—

The directors having caused to be prepared and submitted to them an estimate of the profits of the company for the half year ending the 31st of December last, in accordance with the company's Acts of Parliament, and having duly considered the same, recommend the proprietors to declare a dividend, for the half year ending as above stated, of £3 on every £100 of the ordinary consolidated stock, and at the rate of £3 10s. for every £100 on the consolidated B (7 per cent.) stock, and on the capital paid up in respect of the new £7 10s. shares.

During the past half year the board has sustained severe loss in the death of Mr. Charles Turner, M.P. (who for many years had rendered very valuable services to the company), and also of Mr. Richard Houghton, and Mr. Francis A. Clint.

The vacancies thus occasioned have been filled by the appointment of Mr. D. Owen Bateson, Mr. Edward Lawrence, and Mr. James Fletcher.

Mr. Bateson's accession to the board causes a vacancy in the office of auditor, which the shareholders are now invited to supply.

The proceedings taken by the Mersey Docks and Harbour Board on account of the burning of the landing-stage having resulted in a verdict adverse to the company, terms of settlement have been arranged by which a proportion of the loss is to be payable by this company, and in such manner as will, it is hoped, obviate the necessity for making any increase in the price of gas.

The whole subject of the risks attending the fitting department has engaged the anxious consideration of the directors, who have come to the conclusion that it is undesirable to continue the supply of internal fittings, and this branch of the company's business will accordingly be given up from and after the 31st of March next.

With the view, however, of meeting the requirements and convenience of the public, a portion of the company's premises on which the fitting business is now conducted will be let to a new company which is in course of formation under the provisions of the Limited Liability Acts, and by whom the present stock of the company's chandeliers, fittings, &c., will be taken over at a valuation.

The CHAIRMAN, in moving the adoption of the report, said the company had been forced, as the proprietors were aware, into an action with the Dock Board. The Dock Board took proceedings against them, and they were obliged to defend themselves. They were defeated, and they must submit. They had made a very fair arrangement, however, with the Dock Board, which would enable them, he trusted, to continue to supply the same quality of gas without raising the price. Some remarks having been made about the testing of this company's gas, he had only to say that it was in the power of the Town Council to apply the test themselves. The company were in a very great fix at the end of last year. They were nearly in darkness, owing to the great difficulty in getting supplies of coal of the right quality. And with regard to the price of gas—about which a good deal had been said—the price was only cheapened by the quality. They could have it "cheap and nasty," certainly, but he thought very few of the consumers would like that; and, combining price and quality, he thought it would bear comparison with any gas in the United Kingdom. Some very awkward remarks had been made about the company, and they were considered very unpopular because they demanded a security or deposit from people of doubtful credit or no credit; but he thought that, for the protection of themselves, they adopted the right course. A shopkeeper would not like to entrust a stranger, perhaps, with a quarter of a pound of tea; and the gas company were obliged to protect themselves. The first duty of the board was to take care of their shareholders, and he trusted the shareholders would approve of the course they had taken.

Mr. J. A. TINNE seconded the motion, which was carried unanimously.

On the motion of the CHAIRMAN, seconded by Mr. TINNE, the dividends recommended were declared, payable on the 19th inst.; and on the motion of Mr. PATON, seconded by the Rev. THOMAS GARDNER, Mr. J. R. Darsie was appointed auditor.

The CHAIRMAN said he should like to mention, for the satisfaction of shareholders, that the Finance Committee examined the accounts of the company every fortnight, and compared them with the vouchers; and, as an old banker, he could assure the shareholders that they were very strictly looked into.

Thanks were then voted to the chairman, and the proceedings terminated.

MORECAMBE GAS COMPANY.—The annual meeting of this company was held on the 15th inst. The directors reported that the profits for the past year, including the balance of £75 12s. 7d. brought from the previous year's account, allowed them to recommend a dividend (free of income-tax) of 10s. per share on the 800 £5 shares, and 8s. 5d. per share on the 800 new shares created in 1870, on which £4 10s. had been called up. This would absorb £756 13s. 4d., leaving a balance of £30 7s. 6d., which would be carried to the renewal-fund. They had completed the exchange of land adjoining the works with the Midland Railway Company, and had entered into contracts for the erection of a new station-meter and governor-house (which would be used as an office for the present); also for a new workshop and store-room; and, in order to meet the payment thereof, a call of 10s. per share on the 800 new shares would be made, payable on the 1st of May next. There had been charged to capital account during the past year the sum of £810 4s. 5d.

AIREDALE GAS COMPANY.—The ordinary half-yearly general meeting of this company was held at the gas offices, Idle, near Leeds, on Monday, the 14th inst.—Robert Sutcliffe, Esq., J.P., in the chair. The secretary (Mr. E. Thornton) having read the notice convening the meeting, the seal of the company was affixed to the register of stockholders, and the report and statement of accounts for the half year ending Dec. 31, 1875, were then submitted. The report stated that the undertaking was in a satisfactory condition in every respect—that the consumption of gas was steadily increasing, notwithstanding the indifferent state of trade in the district—and that the reserve-fund now stands at nearly three-fifths of the maximum amount allowed by law. The report further stated that after due and careful consideration of the company's position and prospects, the directors had resolved to reduce the price of gas from 4s. 6d. to 4s. 2d. per 1000 cubic feet, such reduction to take effect from the 1st of January last, and that a uniform rate of 2½ per cent. discount be allowed on all accounts paid within one calendar month after delivery thereof. The usual statutory dividend at and after the rate of 10 per cent. per annum was declared; and as cheques had been drawn out in anticipation of the meeting, it was paid to such stockholders as happened to be present. Messrs. Francis Audsley and George Raistrick were re-elected directors of the company, and Mr. W. Walker was appointed to the seat lately held by Mr. Edwin Berry. The retiring auditor, Mr. N. Jowett, was unanimously re-elected. On the motion of Mr. A. Dibb, seconded by Mr. S. Glover, a cordial vote of thanks was passed to the chairman and directors for their services during the past half year. The chairman briefly responded, and the proceedings terminated.

BIRMINGHAM CORPORATION GAS SUPPLY.

At a Special Meeting of the Birmingham Town Council held on the 15th inst., the Gas Committee made the following report:—

The Gas Committee report that the agreement for the purchase of the land, containing 1a. 0r. 4p., from the Midland Railway Company, scheduled by the late Birmingham Gaslight and Coke Company, has been executed, the price agreed on being £855, a like amount having been agreed to be paid by the gas company for the land. The necessary alterations in the offices in the Old Square, for facilitating business, have been completed. The balance-sheet and accounts have been made up five weeks earlier than usual.

Your committee have pleasure in submitting a balance-sheet exhibiting the assets and liabilities as on the 31st of December, 1875, and a statement of profit and loss for the half year ending the 31st of December, 1875, during a portion of which period the undertakings were in the hands of the Corporation—viz., the Birmingham Company from the 1st of September, and the Staffordshire Company from the 1st of October, the agreement with the companies being that the Corporation should pay a certain amount to each of them in lieu of surplus profits.

The committee recommend the council to authorize them to appropriate from the surplus profits a sum not exceeding £1000, for the remuneration of those officers of the corporation on whom devolved a large amount of extra work in the course of the proceedings for obtaining the Act of Parliament; and they further recommend that the balance of profit be transferred to the credit of the gas reserve-fund.

Dr. *Profit and Loss Account.*

Management—			
Salaries, commissions, and directors fees	£6,928 13 3		
Incidental expenses	2,085 5 0		
		£9,013	18 3
Manufacturing—			
Coals	109,053 18 3		
Purifying materials and wages	1,603 6 11		
Wages, repairs, and sundries at works	33,348 4 7		
		144,005	9 9
Distribution—			
Ordinary repairs & maintenance of mains, services, &c.	4,011 12 0		
Meters—restoring and maintaining	4,010 19 6		
		8,022	11 6
Rents, rates, and taxes		5,100	8 9
Expenses on loans and stamps		789	8 9
Bank charges		627	11 8
Interest on loans and payments to companies		61,046	6 3
Balance, being profit		25,338	15 11
		£253,944	10 10

Cr.

Sale of gas, after deducting discounts, adjustments, bad debts, and expenses of public lamps	£183,902 7 1
Coke and breeze	43,853 0 6
Tar and other residuals, and fittings	25,857 17 2
Discounts on purchases	331 6 1
	£253,944 10 10

Dr. *Balance-Sheet.*

To loans and annuities, capitalized at 25 years purchase	£2,076,125	0	0
Trade debts and customers deposits	53,032	19	10
Interest on loans due	7,723	16	6
Balance payable in cash on Jan. 1, 1876, to Birmingham and Staffordshire Gas Company, in accordance with agreement	103,845	16	2
Balance from profit and loss account	25,338	15	11
	£2,266,066	8	5

Cr.

By property purchased from companies, including land, works, mains, meters, goodwill, and costs of purchase	£1,953,050	16	11
Outlay since June 30, 1875—			
Works	£16,088 9 4		
Mains	11,185 3 5		
Meters, &c.	1,257 5 1		
Land for new works	19,349 6 3		
	47,880	4	1
Amount owing to the Corporation for gas, coke, residuals, fittings, &c., exclusive of estimated discounts, bad debts, and cost of collection	171,263	9	4
Due for rents	86	15	5
Stock of coal, coke, residuals, fittings, &c.	54,124	9	10
Consols (£22,500), valued at	20,891	16	6
Cash at bankers and in hand	18,768	14	4
	£2,266,066	8	5

The MAYOR, in moving the adoption of the recommendation that the Gas Committee should be authorized to appropriate from the surplus profits of the gas department a sum not exceeding £1000, for the remuneration of those officers of the corporation on whom had devolved extra work in obtaining the passing of the corporation bills, and that the balance of surplus profit be carried to the gas reserve account, said it was desirable that he should point out what the accounts represented. The balance-sheets did not represent the net results or the total profits of the gas undertakings for the half year ending the 31st of December last. They only represented that portion of the total profit which accrued to the corporation in consequence of the negotiations which were conducted some time ago with the two companies, under which the corporation obtained an earlier possession of the works than they were entitled to under the Act of Parliament. With regard to the old company, the corporation obtained possession on the 1st of September, giving the company an estimated sum to cover the supposed profit which they had made in the two months of the half year during which they had the management. As regarded the Staffordshire Company, they obtained possession on the 1st of October, subject to an agreement to pay them the whole of the maximum dividend they were entitled to, and an additional sum of £15,000, being the larger portion of the calculated surplus profits they would have obtained had they continued the management. What the corporation had now to show was the surplus profit beyond what he had named which accrued to them owing to what he hoped he might call the good management of the Gas Committee, and the success of the negotiations they conducted. That profit was £25,338 15s. 11d., and it accrued to the town out of the surplus he had named. That sum the corporation had now to dispose of. He must congratulate them on what he might call the almost unexpected windfall, because it was perfectly independent of the general estimated statement of profit and loss they had made for the ensuing year, and it was over and above the sum they had authorized the committee to carry to the estimates for 1876. They would not have got that profit if the companies had gone on until the 31st of December as one of them, at all events, might have done. He might tell them that the accounts had been made out on precisely the same principles as those adopted by the companies. All the allowances they had been accustomed to make for repairs, &c., had been allowed in the accounts of the corporation. The council had, therefore, to consider the recommendation which the committee made as to the disposal of the surplus. They suggested that the committee should be authorized to spend a sum, not exceeding £1000, in some complimentary remuneration of those officers who took so active a part in obtaining the bills of the corporation, and upon whom extra work devolved, in consequence of the absence of the town-clerk from his office. The committee had not decided upon the exact division they would make, but they thought it would be gratifying to the recipients if the matter were left in the committee's hands, instead of the separate claims of individuals being discussed in public. He trusted that recommendation would secure the approval of the council. With regard to the balance of £24,000 odd, the committee thought

the council would agree that it would be a prudent thing to transfer it to the gas reserve-fund. The corporation were authorized to establish a reserve-fund not exceeding, for the first 10 years, £50,000. In a great trading concern like that, the council would see they did not fear or expect accidents. Accidents, however, might occur, and it was desirable for them to have a fund of that kind, which would prevent any sudden demand being made on the rates. There were also possibilities in the way of an alteration in the price of coal, which might render sudden fluctuations necessary, and this would be prevented if they had a reserve-fund. It was his hope that the maximum reserve-fund of £50,000 might be made up and completed within the first year or two of the corporation taking to the concern.

Alderman MANTON seconded the resolution, remarking that, though they must all be glad to have the gas supply in their hands, it was a question whether they should continue the supply of gas-fittings. There were thousands of brassfounders in the town, and he would wish the committee to be very careful to guard against competing with manufacturers. He considered it would be unfair for the corporation, now that they had the monopoly of the gas supply, to become keen competitors with manufacturers of the town, who were heavy ratepayers. He was not surprised at the profit that had been made on the gas undertaking—indeed, he should have been much surprised if they had not done so. He believed the profits they would derive from the gas would cover every farthing of the expense of the mayor's grand project for the improvement of the town.

Alderman BRINSLEY hoped the corporation would not give up the gas-fitting business, which, he thought, was advantageous to the public. It would be gratifying to large consumers, seeing the profit made by the corporation, to have the price of gas reduced. Still, he approved of the appropriation of the surplus to a reserve-fund.

Alderman AVERY said it appeared to him that their operations would be exceedingly incomplete if they abandoned the gas-fitting branch of their business. A reduction in the price of gas had been already made from the 1st of January last to the extent of 3d. per 1000 feet, and the effect of it would appear in the next half year's proceedings. In the meantime, the gas consumers and the public might be heartily congratulated on the successful results attained.

Mr. DAVIS considered it unfair for the committee to supply gas-fittings, and he did not think it was dignified for them to compete with tradesmen in the town in order to gain a monopoly in supplying the fittings.

Mr. BAKER thought that manufacturers were in a far better condition than under the old companies. The companies used to compete one against the other, and there had been instances where they had put in fittings at less than cost price, in order to obtain the supply of gas. There was now no competition of that sort, and the only desire of the committee was, to supply fittings at a fair and remunerative price.

Mr. BEARD asked if the surplus profit made, did not warrant a further reduction in the price of gas. When the mayor appeared at the town hall, he promised that the corporation would charge for gas in the future as the companies had done in the past—that was, that they would make just sufficient profit to pay the maximum dividend, and any surplus should go towards a reduction in the price of gas. That statement of the mayor's was repeated before the committee of the House of Commons, and also before the committee of the House of Lords. As 1d. per 1000 feet of gas realized about £10,000, the surplus profits which had been appropriated by the company, and the £25,000, would make up 6d. per 1000 cubic feet. He therefore considered that the consumers were entitled to a further reduction in the price of gas. For the present he thought they had done wisely in recommending that the money should be carried to a reserve-fund. If reductions, however, were not made, he considered that the burden would fall very heavily on large consumers of gas like himself. He hoped the promises that had been made would be carried out, and that the day was not far distant when a further reduction would be made in the price of gas.

Alderman LLOYD agreed that manufacturers of gas-fittings were better off now than when the two companies existed, but he did not think it a wholesome thing that the corporation should compete with their own ratepayers. In supplying gas-fittings they would always be open to the suspicion of unfairness and jobbery, and he hoped the council would gradually give up the gas-fitting trade.

Alderman TAYLOR said he thought that the council were quite right in endeavouring to secure the fixing of gas-fittings by competent men. They bought the fittings in the best market, supplied them at a fair price to those who wished to have them, and sent competent men to fit them.

Mr. MORLEY hoped the committee would not supply gas-fittings. The gunmakers of the town complained because the Government manufactured guns; and he should like to prevent people complaining of the council manufacturing gas-fittings.

The MAYOR, in reply, expressed satisfaction at the suggestions which had been offered to the committee by members of the council. As regarded the question of fittings, he did not think the committee might be said to have made up its mind on the question. He was inclined to doubt whether any profit had been made by the fittings supplied by the companies in the past; most certainly the committee would not carry on the trade unless there was some profit. But, after all, what would chiefly guide them would be the consideration whether or not the mass of the public desired that convenience, which resulted from a department of the kind in connexion with the gas-works, should be continued. If it was not found to be a public convenience the committee would have very great pleasure in abandoning it. With reference to the possible competition of existing interests in the town, that seemed to have been completely disposed of by statements of several members, to the effect that they were not manufacturers. They simply, in fact, superintended the work while others did it. With regard to the price of gas, he quite agreed with the remarks of Mr. Beard. He desired that the price of gas in Birmingham should always be what it would have been if the private companies had continued; but where he differed from Mr. Beard was in his supposing that the price of gas, under the companies, would have been any lower than under the corporation. Why should the private companies have lowered the price by 3d., involving a reduction in profit of £30,000 a year? It was quite clear the results of the last half year showed the possibility of a still further reduction; but, in the first place, it was to be borne in mind that the last half year was the best of the two half years, and the profits were very much larger upon the second than upon the first half year, as the corporation would find when the committee presented their next balance-sheet. In the second place, the profits were, in a measure, due to the savings which the committee had made. They estimated there would be a saving of £25,000 per annum, under the management of the corporation—a saving exactly of the kind stated by Mr. Beard, owing to amalgamation, and to the amount of interest saved upon increased capital. All they had taken credit for, in the way of profit for next year, was this amount of £25,000 per annum. If they found, at the end of the year, they had made more than that, then it would be for the council to consider whether some additional reduction should not be made. He was sanguine, unless the price of coal was materially altered, that a reduction would be made for the year 1877; but he did not anticipate any reduction during the current year. When gentlemen talked, as he found gentlemen did sometimes, about the comparative price of gas now and the comparative price of coal, they forgot that there were other elements in the manufacture of gas besides the cost of coal. The cost of coal now was between 10 and 15 per cent. more than formerly, because gas coal was limited in quantity, and did not follow exactly the cost of other kinds of coal. Then the price of labour had gone up something like 20 or 25 per cent. Then, on the other hand, the value of the coke, which was the chief residuum they had to sell, had gone down to the extent of between 15 and 20 per cent., and when they put those items together, they would see that there was no comparison between now and 1871. The committee would always keep in view the interests of the consumers, as well as the interests of the ratepayers.

Alderman LLOYD said his objection was not that the Gas Committee manufactured gas-fittings, but that they supplied the materials and they supplied workpeople, so that the trade of the authorized gas-fitter had been destroyed in Birmingham through the companies doing this.

The MAYOR thought it was not the case that the trade had been destroyed. The committee had succeeded the companies in this business, and nothing could be more foolish than for them to abandon it without sufficient experience; but he was certain the committee, at a later period, would give it up if it would not suit the convenience of the public.

The resolution was then carried.

The MAYOR moved the approval of the report, which was agreed to.

SUGG'S ILLUMINATING POWER METER.

At the Meeting of the Institution of Civil Engineers on Tuesday, Feb. 15—Mr. G. R. STEPHENSON, President, in the chair—the Paper read was "On Estimating the Illuminating Power of Coal Gas," by Mr. William Sugg, Assoc. Inst. C. E.

It was observed that, notwithstanding the attention which had been bestowed upon the subject, gas photometry was still in an unsatisfactory state. With even the most perfect apparatus, the same quality of gas was differently estimated in different places, because there was no generally recognized standard burner. The jet photometer, originally invented by the late Mr. George Lowe, M. Inst. C. E., had been so improved, that it was possible to ascertain, by simple inspection, the true illuminating power capable of being evolved from different coal gases.

It was generally acknowledged that the most accurate way of estimating the illuminating power of gas was by burning a known quantity of that gas in a standard burner, and comparing the light with that from a known quantity of oil or sperm, consumed in a certain kind of lamp or candle. In England, since the year 1852, the parliamentary standard of comparison had been a sperm candle, of six to the pound, burning at the rate of 120 grains per hour; but the average normal rate of burning of these candles was nearer 130 grains than 120 grains. Therefore, it was desirable that the parliamentary standard rate should be altered, if a change could reasonably be made. The greatest obstruction to the adoption of a uniform system of gas photometry had always been the difficulty of settling the kind of burner with which the gas should be tested. With the standard quantity of the same gas, different kinds of burners gave different results; and the same burner gave different results with the same standard quantity of gases of different illuminating powers, richer or poorer, according to the kind of gas it had been originally designed for. In 1863 Dr. Letheby designed, in conjunction with the author, a standard burner with a 15-hole incorrodible steatite top. Previous to this all testing-burners had iron tops, which were subject to alteration by oxidation. This burner, known as the "Sugg-Letheby" 14-candle burner, was one of the parliamentary standard testing-burners for 14-candle gas, and was used, with a chimney 7 inches long and 2 inches wide, in some parts of North and South America, in Canada, Australia, and New Zealand. There were, however, two other parliamentary burners for 14-candle gas—viz., one described in the Birmingham and Staffordshire Gas Act of 1864, for testing the gas supplied to Birmingham, Hanley, Hull, and, till lately, Brighton. The other 14-candle burner was that adopted by the Gas Referees for London, in 1869. It was the invention of the author, and was known as Sugg's "London" standard Argand burner for 14-candle gas, and it was used for testing the gas supplied to the City and other parts of London by The Gaslight and Coke Company, the Imperial Company, the South Metropolitan Company, and by a number of companies in the provinces. It was also the new standard burner for the Dominion of Canada. The same standard quantity of the same quality of gas tested by these three burners showed very different powers of light, the "London" burner evolving the greatest, and the Birmingham the least amount of light. The total difference was nearly 3 candles.

There were three different parliamentary standard burners for testing 16-candle gas, all to consume the standard quantity of 5 cubic feet per hour—viz., the "Dublin" 16-candle Argand 15-hole steatite-top burner, used with a chimney 7 inches long by 2 inches wide; the "Dublin" flat-flame 16-candle burner; and the "London" standard Argand for 16-candle gas, with a 24-hole steatite top, to be used with a chimney 6 inches long and 2 inches wide. There was but one parliamentary standard burner for consuming 5 cubic feet per hour of 18-candle gas—viz., that described in the Leamington Gas Act, which was a modification of the "Sugg-Letheby" burner, the central aperture being enlarged to supply more air to the richer gas. The "London" 18-candle burner for the standard quantity of the same quality of gas gave an amount of light equal to about 2½ candles more than the Leamington burner. For 20-candle gas the parliamentary standard burner had been described by the gas referees as Sugg's steatite bat's-wing, No. 7. It was used in London and in Liverpool. For 27 up to 32-candle gas it was customary to make use of any kind of fish-tail burner, and to consume any quantity of gas, at the option of the operator. For cannel gases there was no regularly authorized parliamentary burner.

By the system of the author, one standard burner only was proposed for all qualities of gas from 12 to 30 candles. This burner might be readily gauged and verified by actual trial against the Government standard burner. It was the gas referees "London" Argand burner, with a chimney 6 inches or 7 inches long, by 1¼ inch wide, producing a flame always 3 inches in height; in fact, such a burner as was ordinarily adopted by consumers. When used with 16-candle gas it would burn 5 cubic feet per hour, with a 3-inch flame, the light from which would be equal to that given by 16 sperm candles of six to the pound. The quantities of different qualities of gas required to produce in burning a 3-inch flame with this burner, were with—

12-candle gas	6·6	cubic feet.
14 "	5·7	"
16 "	5·0	"
17 "	4·7	"
18 "	4·4	"
19 "	4·2	"
20 "	4·0	"
25 "	3·2	"
30 "	2·7	"

Eight different sizes of "London" Argand burners were shown, which gave *pro ratâ* amounts of light for different quantities of gas, varying from 2½ feet to 7½ feet per hour.

Of late years a Gas Referees standard burner had been constantly used by the author as a standard light for testing various kinds of gas-burners, and it had been found that the illuminating power, as well as the appearance of the 3-inch flame, had been always constant, notwithstanding considerable variations in the quality of the gas. The proposed method for effecting a comparison was as follows:—The Gas Referees 3-inch flame burner having been fixed on a photometer in the place usually occupied by the standard burner, it was lighted, and allowed to burn off all the dead gas collected in the meter and fittings of the apparatus. Then a clean chimney was put on, and the height of the flame

regulated, by the aid of the usual micrometer cock and King's pressure-gauge, to exactly 3 inches. The quantity of gas per hour required to give this flame was then found, and a reference to the table would show the examiner the illuminating power of the gas. The rest of the experiment was performed in accordance with the instructions of the gas referees, and would be a corroboration of the table, and at the same time a check upon the accuracy of the sperm candles, which were very subject to error. The result was illuminating power of the gas in terms of the parliamentary standard quantity of 5 cubic feet of gas and 120 grains of sperm candle. Every quality of gas tried upon this system would be fairly consumed, and a like quantity of gas would be designated by the same number of candles of illuminating power.

The paper was illustrated by diagrams and an actual specimen of a new and simple apparatus, the invention of the author, termed an "Illuminating Power Meter," by which the illuminating power of gas could be read off from a dial at once in standard sperm candles. No previous knowledge, either of the manufacture of gas, or of its chemical composition, or of the mode of testing it, was requisite for the use of this novel instrument.

[We hope to be able in our next to give a description and engraving of the meter here referred to.]

AMERICAN GASLIGHT ASSOCIATION.

[Condensed from the Report in the *American Gaslight Journal*.]

WEDNESDAY, OCT. 21, 1875.

(*Continued from page* 210.)

The discussion of the paper read by Mr. Patton the previous day, "On the Use of Petroleum and its Products in the Manufacture of Illuminating Gas," was resumed this morning by Mr. EDGERTON, who said the ground generally taken was that it was better to manufacture gas of a comparatively low illuminating power than otherwise. He proposed to show that this idea was a mistaken one. In the cities of Glasgow and Edinburgh 32-candle gas was sold with such manifest success that, if he remembered rightly, there was in the former a greater number of consumers in proportion to the population than in any other place in the world. Even the labourers there were able to burn gas. In London the tendency was to an increased standard of illuminating power, and in Liverpool poor gas had been forced out of existence. Coming home to their own country, they found a vast difference in illuminating power, as furnished by many of the companies, but the result was just such as they might anticipate, those furnishing the rich gas increasing in consumption, those supplying poor-gas falling off. In one case within his knowledge, a company manufacturing 24-candle gas had taken away 800 consumers during the year from the company selling poorer gas; in another case 3500 consumers had shown their preference for high quality gas. Hence he believed the true solution of the question was to manufacture a high quality gas, getting pay in proportion, or on an illuminating basis, instead of the cubic foot basis. In regard to "enriching" coal gas with oil gas, he would simply say that those whose feelings were eased by calling this new departure "simply an enriching process" to coal gas, could do so. Furnished as "enriched coal gas," the increased quality went entirely to the benefit of the consumer, and though expense of production was decreased, it was not sufficient to compensate for decreased consumption. He therefore repeated, that rich gas must be sold on a basis of illuminating power, if they wished to avail themselves of its great advantages. The facts stated by him were those of a large practical experience. On the other hand, the advocates of coal gas, having had no practical experience with oil gas, were in no position to speak with any authority. It was all theory with them. They had not given a single fact, or furnished any data in this discussion. They did not take any position which they were able to sustain by facts or figures. They had not told the association what yield could be obtained, even experimentally, nor the quality of the product, nor, in fact, had they made any public utterance on record, except in one lame case it was asserted by a gentleman that oil gas would stratify! Was he ready now to discuss stratification? All the useful information must necessarily come from those who had had practical experience with the manufacture; those who had been working it successfully for years.

Mr. HARBISON said he had heard from a stockholder that the Harlem Gas Company had ceased using the oil gas.

Mr. EDGERTON replied in the affirmative, but said that was probably all the honourable member knew about it. He did not know the very good reasons they had for ceasing. Some gentlemen who considered themselves well informed on the oil gas question, who had experimented or dabbled, he might say, in it, yet failed to come forward and state a single fact publicly. A committee, of exclusively coal gas men, was appointed to investigate the question, and had had a year to do it, and yet no report was forthcoming from them. They heard of many contradictions in private, but how was it that no one cared to put himself on record publicly as an opponent of the new gas? He thought a new committee should be appointed to thoroughly investigate, as suggested by Mr. Neal, chairman of the former committee. It was due to the standing of the association to get all the information possible on the subject, especially as there were those engaged in the manufacture of oil gas both ready and willing to give it. He had stated that on a large scale (500,000 cubic feet daily) 1000 cubic feet of 42-candle gas had been realized out of ten gallons of the cheapest petroleum, naphtha or benzine, and that one man could make at the rate of 70,000 cubic feet daily; each bench of six retorts, 120,000 daily. The gas was diluted with about 19 per cent. of air, when it showed 42 candles in the photometer.

The PRESIDENT: Do you mean 19 per cent. of air added to the 1000 cubic feet, or 19 per cent. of the 1000 cubic feet?

Mr. EDGERTON: Nineteen per cent. of the 1000 cubic feet.

The PRESIDENT: Then you do not produce 1000 cubic feet, but lack 19 per cent. of it?

Mr. EDGERTON: Yes. It was a mixture of gas and air. This yield, so far as the oil gas alone was concerned, was less than 1000 cubic feet for ten gallons, but the oil gas alone would have been of far greater illuminating power.

Mr. PRICE: How much will ten gallons of oil give alone?

Mr. EDGERTON: A maximum result, on the large scale, of 800 cubic feet of 80-candle gas has been realized.

Mr. PRICE: How much gas will ten gallons give alone?

Mr. EDGERTON: It will give 800 feet of 80 candle, on a large scale, which amounts to 225 million feet per annum—*i.e.*, for oil alone.

Mr. ALLEN said he should be very brief in his remarks, and refer neither to London nor Liverpool, nor, indeed, to any foreign country. He believed that the manufacture of gas in America had attained a great success, and that they had enough experienced gas men to understand this question, without going abroad. Mr. Patton spoke on the previous day of the effect of pure hydrogen. But that was all out of the question, for nobody pretended to make pure hydrogen. They could not use it; it was not practical at all. He also laid it down as a proposition that any diluant was a detriment, and that it was resorted to as a "temporary subterfuge only." The questions, therefore, which he (Mr. Allen) put to him were to call out the fact that over 90 per cent. of common coal gas was a non-illuminant, and if that was a "subterfuge only," why then the whole gas manufacture was a "subterfuge only." He agreed with Mr. Neal in what he said when speaking of the use of oil with coal in the manufacture of gas. If they took any coal that was fit to make gas at all, it would make a gas so near what they wanted, that they could scarcely get an apparatus which would pay for adding oil to get two or three candles. If they made a gas of very low candle power, it was apt to be from poor coal, filled with sulphur, &c. Now, these facts must be true, because if they took gas made by the decomposition of steam, which, though it had a small illumination, was called a non-illuminant, and poured in a stream of oil not larger than a small knitting-needle, and let it run continuously, it was with difficulty the gas was kept below 17 candles. Sometimes it ran up to 18, and then to 16. Consequently, if the gas was 12 or 14 candles, and they had oil poured in, it would reduce that small stream still lower, to add two or three candles more to it. And he did not think it would pay. But when they came to take, as the basis of gas, a non-illuminant, it then took from 3 to 3½ and 3¾ gallons to make a 17 and 18 candle gas. This he stated as a fact, and was ready to show books and figures in proof of it. If people wanted air, they were entitled to it. If anybody thought that air was gas, or ought to be in gas, they were welcome to use that process; he did not like it. His experience was that every particle of air contained in gas was a deterioration. He did not want any in his. His theory was that a rich gas, to be made most profitable and useful, must be diluted, and that with a permanent gas, and not anything else. No foreign substance should be admitted into the gas which formed a mere mechanical mixture. He invited all who desired to see how his process worked practically, to come and examine for themselves. With regard to diluants, he remarked that at least one question involved in a diluant was that it should possess a high heating power, because, as they all knew, light was produced by heat. The greater the heat, the greater the light. Now, that was the effect of hydrogen and carbonic oxide united together as a diluant, it possessed a greater intensity than any other gas, and therefore became the very illuminant that was necessary for gas. Then, again, it was well known that it was almost incondensable, and would remain longer in the holder, and travel a greater number of miles without any condensation than any other gas. If they got a basis for a gas which was incondensable, and which had a high calorific intensity, and substituted that for a non-illuminant, then they got something which had light. Then it became a question of how much pure carbon required to be added, to make 17 or 18 candles. He had proved the fact in making over 4 million feet, and found that it averaged 3 72-100 gallons. Could that illumination be got from any coal at as cheap a rate? He thought not. The gas had been tested at 6° below zero, and its condensation at that temperature was four times less than coal gas at the same temperature. There was no possibility of naphthaline forming in the gas. Naphthaline was formed by a certain condition in gas which never could exist when hydrogen was present in much greater proportion than in coal gas. He believed it would be found that hydrogen and carbonic oxide, united together, produced the most permanent gas that could be made, and the cheapest basis for an illuminating gas that could be found; and he believed that adding oil to it gave the cheapest illumination that could be furnished. Mr. Nettleton read some figures on the previous day, and he (Mr. Allen) begged the members of the association to look at those given for September. He was there and saw the operation of the company, and their figures. They charged to the production of September all the help that was necessary to make more than 100,000 feet of gas a day. With the benches in use, they made at the rate of 80,000 feet a day, although it was only charged as 38,000, which would produce 60,000 or 70,000 or 80,000 feet; except simply the materia', 63 72-100ths gallons of oil, and a little less than 17 pounds of anthracite coal to the 1000 feet. All the other expenses were charged upon lesser quantities. All practical and scientific business men would understand that when they charged as 38,000 feet it bore a much greater proportion to the cost than when they doubled it. If they had to start a new bench of 39,000 or 40,000 feet, they charged for an additional fire, but not additional help. There was one other point he would like to speak of. He had met from coal gas men this objection. They said, "We have seen the gas, and know how it is produced, but customers will not take so much of it as they will of coal gas." Of course not. A man did not want as many sperm candles as he did tallow candles. If he had a better quality of gas, the less he would want to use of it. The question arose: If a company could make 17 or 18 candle gas so much cheaper than 14 or 15 candle gas, and could make a much greater profit on a gas of that kind, ought they to make their customers use a larger amount of gas than passed through their burners, for the sake of having them take more thousands of it? The president of one company showed him their figures for eight months of last year, when they were running this process (this year they were not). He was going to lay them before his board, and had prepared them for that purpose. Those figures showed that they had paid 37,000 dols. more for their material this year than they paid last year. Their consumers taking more gas this year than last, made up 30,000 dols. of that, and the company were 7000 dols. out of pocket. Taking this statement by the president of a company who had prepared it to lay before his directors, the question arose—Ought there to be such a tax levied upon consumers where it was not one cent of benefit to the company? To make them pay 30,000 dols. in these times, especially when the company were not making a cent of money out of it, but, on the contrary, losing 7000 dols., was a pretty heavy tax; and he stated that if he gave a close statement, it would be still greater, for he charged the coal and labour this year at the same rate he did last year, while it was cheaper.

Mr. NEAL asked whether the company first referred to was the Citizens Gaslight Company of Brooklyn.

Mr. ALLEN said he did not wish to name the company, but he had no right to prevent gentlemen from guessing, and if they guessed right at first he could not help it.

Mr. OLNEY asked whether the figures just quoted referred to the operations of the last twelve months.

Mr. ALLEN said they did not, and he was not responsible if the president had found he was in error, and modified his statement. He had been speaking of figures shown to him a month ago.

Mr. HARBISON said he should like to ask Mr. Allen why it was that at a large gas-works in Connecticut, in which his patent project for making gas was formerly used, it had now been given up?

Mr. ALLEN replied that at the time he tried it there they had nothing but common retorts, and it was found, after a most thorough investigation, that the steam could not be perfectly decomposed in iron apparatus, and so the profits were destroyed. There was an improvement found in the use of clay retorts, but they had no manufactory for retorts of that kind. He sent to Belgium and got retorts, but they did not do much better. He continued the manufacture of his gas for the company referred to by Mr. Harbison for five months, and after he left, the company carried it on for a further service of five months.

Mr. HARBISON said he had not himself dabbled in petroleum, but he might say that he had been told by a shareholder in a gas company in that island, that the gas-works at Harlem, where petroleum had been used for some time, had just given it up.

Mr. PATTON remarked that Mr. Edgerton's idea was that the commercial value of gas was its illuminating power. He further stated that he diluted his gas with air. Now, every one, of course, knew how much air destroyed this commercial value. He himself had been recently present when tests were made with different gases. One gas contained about 10 per cent. of hydrocarbon, and the gas was mixed with 8 or 10 per cent. of air. The illuminating power of the gas was 19 or 20 candles. Another gas was tested containing from 5 to 6 per cent. of illuminating hydrocarbon. This gas was not mixed with air, but it contained about 40 per cent. less of this commercial value, and the hydrocarbon gave it an illuminating power of 20 candles. If a company had poor gas, and wanted to increase its illuminating power, they used cannel or some other enricher; if Mr. Edgerton destroyed this illuminating power by mixing air with

his gas, he consequently destroyed its value. He thought there was something wrong about this, which Mr. Edgerton ought to explain. By mixing air with gas they deprived it of its heat, and caused it not to burn properly. A further consequence was to increase the weight of the gas. An increase of weight without illuminating power involved more pressure, and more pressure involved necessity for larger mains, and these were all items of expense. For his own part he was not in favour of having heavier gas without having greater illuminating power. He wished Mr. Edgerton would explain, in the first place, whether he considered the true standard of commercial value ought to be taken to be the illuminating power of the gas, and whether, secondly, if he deteriorated that illuminating power by the admixture of air, his two propositions were not directly in conflict.

Mr. EDGERTON said Mr. Patton had correctly stated the case, as far as regarded the effect which the introduction of a certain element would have upon the illuminating power of gas, but he did not comprehend the point he had made. What he meant was that, instead of reducing the illuminating power of the gas, they should sell it at its illuminating power. He did not want to dilute it with air at all. If diluted, it should be diluted with coal gas, but he did not want to bring it down to the standard of coal gas.

Mr. LITTLEHALES said the idea was very good theoretically, but he did not think it was practical. He believed it would be impossible to carry it out.

Mr. EDGERTON remarked that it was carried out in 26 places in the United States.

Mr. ALLEN, in answer to the question put by Mr. Harbison, as to why the use of petroleum had been discontinued at the Harlem works, said the reason was that, for some time, they had not arrived at a successful result in the use of retorts. Afterwards they formed a new retort, which they believed would answer the purpose; but they had not been used, owing to a want of agreement between the engineer and the president of the company on the subject. The last time he (Mr. Allen) saw the engineer, he assured him he had not altered his opinion as to the value of the process.

In answer to the PRESIDENT,

Mr. PEEBLES (of Edinburgh) said, in the discussion of the subject, he had been carried back to a paper written by Dr. Stevenson Macadam, of Edinburgh, in connexion with the manufacture of gas from oil. He (Mr. Peebles) knew that he would be asked questions about this discussion, when he returned to Scotland, by persons who were interested in the subject, and there were one or two points he should like to be informed upon, in regard to the practical manufacture of this oil gas on an ordinarily large scale. The first was, whether the gentleman who read the paper used a vertical or horizontal retort; secondly, the method of introducing the oil, and whether the retort was full of incandescent coke or empty, when the oil was sent in; thirdly, the specific gravity of the oil he used; and then, above all, the stability of the gas. It had been stated that the gas was of 70-candle power. In Scotland the gas supplied was of high illuminating power, but nothing like that, and he should like very much to see it; but the question, above all others, was as to its stability—whether it would stand very long without condensation. Dr. Macadam made a very interesting and valuable series of experiments on the subject, and if any of the members present would refer to the London JOURNAL OF GAS LIGHTING of a year or two ago, they would see an exhaustive report of his experiments. There was one thing, however, that stopped his progress in the manufacture, and that was the want of stability of the gas; otherwise, the process was altogether successful. That, therefore, was the one particular point he (Mr. Peebles) should like to be informed about, so that he might be able to answer questions when he got home. As to the decomposition of steam, in connexion with the manufacture of petroleum gas, Mr. Spice, of London, was going very thoroughly into that question at present. No one could doubt his ability to attack any problem connected with gas manufacture; and, at the last meeting of gas managers at Leeds, he gave an interesting account of his new water gas process, which in his hands had been very successful. Mr. Spice had given up the use of horizontal retorts, and now used them set vertically, sending the steam down through a vertical pipe nearly to the bottom of the retort. He attributed the success he had met with to that little change, and was very hopeful of conquering all difficulties, and bringing to a practical and successful issue the water gas manufacture. He (Mr. Peebles) did not know that he should be able to give this association much information in regard to the manufacture of gas in Scotland. Not being a practical gas-maker himself, he was not personally concerned in these matters; but, being very much interested in the subject, he was always on the *qui vive* to see what was going on, and, as far as possible, keep up with the progress that was being made. There were one or two things receiving a good deal of attention just now at home. One was mechanical stoking, which, in several instances, was being very successfully followed where the machines invented by Mr. Foulis, of Glasgow, had been adopted. These were worked by hydraulic power, and went easily and quietly through the process of charging and drawing the retorts. They were in successful operation at the Dawsholm works, near Glasgow; also at Manchester, and some of the London companies were now adopting them. He should like very much to see these machines put in operation in this great country, where labour was so expensive, and where, on account of that, they could be used under even more favourable circumstances than at home. There had been many attempts made lately to relieve the retorts from pressure by removing the seal from the dip-pipes in the hydraulic mains, and of all the methods which had come into notice, he thought that of Mr. Hawkins, of Sheffield, would probably take precedence. He could scarcely describe it without a diagram. It was very simple, and was automatic. There were no levers, chains, joints, or anything of that kind about it. In the interior of the hydraulic main, there was a cup suspended below the dip-pipe, the edge or lip of the cup being a little below the water level. The gas blew out the water which was contained in this cup when the retort-lid was put on, and when it was taken off the water found its way over and into the cup, resealing the dip-pipe. The arrangement was cheap, and could be readily adapted to existing apparatus. There was another matter he thought worthy of the attention of this association. Mr. Cusiter, late manager of the Dalkeith Gas-Works, who no doubt would have become one of the northern stars had he lived, made some successful experiments on the remarkable property of paraffin oil, in taking away much of the illuminating power of coal gas when made to pass through it. He (Mr. Peebles) made some apparatus for Mr. Cusiter, and was much interested in his experiments. Unfortunately, he was taken away by death before he completed them, but his brother-in-law, Mr. Young, a clever chemist, took the matter up, and brought it before one of the Scotch Associations. Of course, that property of paraffin oil had long been known, but no systematic experiments had ever been undertaken regarding it, and those of Mr. Cusiter were not only interesting, but might yet turn out to be of great value. He (Mr. Peebles) was sorry that, in connexion with this subject, he must touch upon patents, but he should like to mention a process patented by Mr. Aitken, in which—unlike the ordinary method of allowing the gas to bubble through the tar and oils in the hydraulic main—it was led off at once into a large chamber, which was kept heated. When it was considered that the gas as it issued from the retort was composed of a series or collection of tarry globules, each containing a particle of gas, the gas expanded in this chamber, burst the globule, and went off without further contact with any of the liquid products. Mr. Aitken's theory, based on and springing from Mr. Cusiter's experiments, as to the property of the paraffin oils abstracting the illuminating power from coal gas was, he thought, very beautiful, and he was hopeful that the invention would make a great change in the quality as well as the quantity of gas produced, as there was no doubt but that gas suffered great deterioration by being blown through the mixture of tar and oil in the hydraulic main. In concluding his remarks, Mr. Peebles thanked the members for the courtesy they had shown him.

A MEMBER: What do they pay for coal in the city of Edinburgh, and what is the selling price of gas?

Mr. PEEBLES: The price of gas a short time ago was about 5s. 6d.; but at present I think it is 4s. 10d. per 1000 cubic feet. The illuminating power I cannot state exactly, as the city is supplied by two companies—the Edinburgh Gas Company, and the Edinburgh and Leith Gas Company. Both supply gas of from 28 to 30 candle power, and 28-candle is, I think, about the average illuminating power of the gas in Scotland.

A MEMBER: Do they make it entirely from cannel?

Mr. PEEBLES: Yes, they make it entirely from cannel. I do not think bituminous coal is used at all; it is not needed, we have such a supply of cannel. There is an impression abroad with us, that if we go above 30-candle gas it is difficult to burn, and apt to smoke, unless it is delivered with a high pressure at the point of ignition.

Mr. PATTON, in reply to the questions asked by Mr. Peebles, said the retorts used were horizontal. As to the specific gravity of the oil, he had used the various grades of petroleum and its residuum, ranging in gravity from 65° to 75°. With reference to the stability of the gas, he might state that he had kept it in small holders for several months at a time, extending over a portion of winter and a portion of summer. This was gas of 70-candle power. The works he had built had holders containing some 4000 or 6000 feet, connected with holders of a larger size. The Philadelphia and Reading Railway Company used the gas pressed in cylinders. They took a number of cylinders—some 60 or more—and pumped the gas into them at a pressure of 300 lbs. to the inch, and there it remained until it was wanted for use in the passenger cars. It was then run into small cylinders under the cars, and remained there for, say, a week—*i.e.*, one cylinder carried about a week's supply.

A MEMBER asked whether, in the experience of the railway named, there was any condensation in these cylinders under the cars at the last end of the charge.

Mr. PATTON said he believed not. The company previously used coal gas, and found considerable trouble from condensation in the cylinders. In using coal gas, they pumped it directly into the cylinder. Now they pumped the oil gas into the battery of cylinders, and the condensation which took place in these first cylinders was thrown off, so that it left very little, if any. All the condensation took place in the first operation. He would say that there was a condensation that reduced the gas below 70-candle power when a pressure of 260 lbs. was applied.

Mr. HARBISON: What condensation did you find in the gas you spoke of as having been kept ever so long?

Mr. PATTON: I did not find any material loss in the gas. I did not subject it to a very severe test. It was a very small holder, and the gas remained over from about March until along into the summer. I have also for several months at a time kept it compressed in a cylinder.

(To be continued.)

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

There is again no change of importance to note as having taken place this week, but it may be stated that at several of the foundry establishments there is a clearly better feeling observable, and a larger quantity of work is in hand at many of those works than has been the case for months past. Gas and water pipes, and the necessary irregular castings for their use, are, as I stated last week, in improved request, both on local and London account. This is very likely to be the case, with more or less regularity, for some years henceforward, inasmuch as the adoption of the constant supply system by the London companies must inevitably lead to a thorough rearrangement of their distributing services, and a consequent putting down of great lengths of new mains. Some of the best London orders of this class recently given out are understood to have been placed with Middlesbrough and Glasgow firms, who are in a position to compete with the producers of this locality, owing to the cheap sea freights they enjoy, as compared with railway rates for the carriage of heavy castings.

Pig iron has given way pretty generally to the extent of about 1s. to 1s. 6d. per ton, the drop being more especially noticeable in the lower-class brands of the Cleveland district. Agents here now quote general North Yorkshire brands at the following figures:—No. 1 foundry, 53s.; No. 2 foundry, 51s.; No. 3 foundry, 50s.; No. 4 foundry, 49s.; No. 4 forge, grey, 49s.; No. 5 forge, mottled, 48s. 6d.; No. 6 forge, white, 47s. 6d.; refined metal, 70s.; Kentledge, 59s.; and cinder pig, 40s., all net prices at producers works or in waggons. The coal trade remains in a very quiet state, and prices are for the most part purely nominal. For instance, although the Steam Coalowners Association's official rate to large buyers—*i. e.*, the railway companies—is 10s. 6d. per ton, yet, to my own personal knowledge, a colliery concern not many miles from Sheffield are supplying coal of this class to a certain railway company at 7s. 6d. per ton. In other respects similar underselling is in vogue.

IRON AND COAL TRADES OF SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE.

(FROM OUR OWN CORRESPONDENT.)

There is no change worthy of note in the condition of the iron trade of this district since last report, business continues extremely dull, and the depression is now gradually extending to those branches of the trade which hitherto have been moderately well sustained.

Specifications are exceedingly scarce, and buyers are evidently keeping back the few orders they have for distribution, in anticipation of a reduction in prices, which, it is now pretty generally believed, will be declared before long; indeed, a substantial reduction in prices must be made, if makers in this district are to compete at all with the South Wales and North of England producers. Prices are nominally unchanged on the basis of £10 for marked bars; but considerable irregularity prevails in the selling rates of unmarked iron. Boiler-plates, sheets, and nail-making iron are the leading features of demand. Galvanized roofing sheets continue in moderate request, chiefly on account of the Australian and New Zealand markets. Competition amongst local manufacturers themselves, is for the present very keen; and prices for all descriptions of finished iron have a decidedly easier tendency.

In pig iron the market is upheld, as regards the best South Staffordshire brands, by the great and increasing curtailment of production; but it is evident that nothing short of a substantial reduction in prices will restore anything like a healthy demand, while for the common qualities of pig iron, prices are growing weaker, and sales have recently been effected at rates which barely cover the cost of production.

An important and influential meeting of ironmasters was held at the Queen's Hotel, Birmingham, on Thursday last, to consider the proposal for establishing a Conciliation Board for the Regulation of Wages, when it was determined to proceed with the formation of the board, and with this object a conference of representative masters and operatives will shortly be held, to consider the modification of the scheme, already drawn up by the president of the Ironmasters Association (Mr. J. P. Hunt). The resolution passed was as follows:—"That this meeting, having heard the proposition made for the formation of a Wages Board, and having approved generally of the plan proposed, instructs the secretary to proceed forthwith with the election of twelve representative em-

ployers in accordance with the scheme, who shall also be a committee for the arranging and carrying out of the details, and report to the future meeting of the trade."

The coal trade is quiet, and prices have a downward tendency, but the actual reductions which have been made are not yet of important extent, and the official list is unaltered. Many of the collieries are now only in partial operation, some coalowners preferring to restrict the output rather than make material concession in prices. A general reduction is, however, now expected at an early date.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

A generally depressed tone, accompanied by a weakness in prices, continues to prevail throughout the coal trade of this district. With regard to the gas coal trade, this is now between the seasons, old contracts being worked off, whilst it is too early for new ones to be entered into. For house coal there is very little demand, and the small extra inquiry which was temporarily caused by the few days of frost, has not materially affected the market. Stocks in some cases are being put down, but a large number of the pits are not working more than about half the week. Good engine classes of fuel, which are the only descriptions of coal for which there is really any demand, are, if anything, a trifle stiffer in consequence of the present limited supplies, and a little more money is being asked in some quarters. The advanced prices, however, are difficult to obtain, and common sorts are still offering at very low rates. The average pit prices in the Wigan district may be given as under:—Arley, 13s. to 14s.; Pemberton four-feet, 10s. 6d. to 11s. 6d.; common house coal, 8s. to 9s.; burgy, 6s. 3d. to 6s. 6d.; and good slack, 4s. to 6s. 6d. per ton, although in some cases 5s. per ton is asked.

There is little or no demand for coal for shipment, and South Wales coal is offering at the ports in the Mersey at such very low rates, that Lancashire colliery proprietors have little chance of securing the few small orders that are in the market.

The iron trade continues to exhibit a downward tendency, and buyers show no disposition to give out any orders of importance. Local brands of pig iron are fully 1s. per ton lower than last week, the principal makers now quoting 62s. 6d. to 63s. per ton, for No. 3 foundry delivered into the Manchester districts, but other brands are offering in the district at such very low rates that they are unable to secure new business to any extent. In the manufactured iron trade there is still very little doing, and although quotations are not materially altered from last week, prices are easy.

In the various finished-iron works makers complain that there is more going out than is coming in, and in many cases they have great difficulty in keeping their places going.

The failure of Mr. Joseph Twibill, announced in my last report, has been followed by the suspension of Mr. Robert Squire James, lately in partnership with him, and also carrying on the business of an iron merchant and ironfounder. The total liabilities are estimated at £30,000.

A reduction of 20 per cent. will in all probability be shortly made in colliers wages in the Wigan district, and there is an uneasy feeling as to what course the men will take with regard to the matter.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

Mr. Hopwood, Q.C., has made a reduction upon the current rate of wages paid to pitmen in the Durham district, equal to 7 per cent. Whether that will meet the requirements of the trade it is difficult to say. The qualities of coals in the Durham district are very dissimilar. Best gas and household coals maintain a pretty uniform rate. Second-class gas manufacturing coals, and second-class steam, have varied most materially in price within the past twelve months. A good deal of the inferior qualities of coal have, undoubtedly, been consigned to the continental ports within the period mentioned, to realize what they would fetch in the open market. They have had to compete with Yorkshire and Scotch coals, and it is a fact that some shillings per ton less money have been, in many instances, realized upon these consignments than is paid for similar coals bought by merchants upon Newcastle Quayside. Best steam coals are in very little demand, and the Northumberland pits continue to work about half time, with poor shipments at the Northumberland Dock.

There has again been an abundant supply of tonnage in the coal ports. Freights for sailing ships are decidedly lower, and a good few coasters are lying in the Tyne unchartered, there being few orders in the market. Freights generally are low. A very poor freight is paid to steamers for London, and rates to sailing ships are down 1s. per ton. The coke trade is moderately good.

There is no improvement to note in the iron trade of the northern district. With the exception of Newcastle and Gateshead there is not much work doing in finished iron on the Tyne. The foundries are better employed, and a good few gas and water pipes and other castings will be ready for shipment in the spring.

The chemical trade of the Tyne is extremely dull. There seems a complete stagnation of trade to the United States and Germany. In consequence of this there is a great falling off in the demand for English chemicals. Last week about 9000 men in this trade were locked out by the masters. A question of wages had been referred to arbitration, and the court determined that there should be a reduction of 7½ per cent. upon current wages, but a section of the men refused to be bound by the award. The masters thereupon locked the whole of the men out; but terms of agreement were come to, and work will be resumed at the factories this week.

The general manufacturing trade of the Tyne shows little signs of improvement, and business generally is flat. Wages continue to have a downward tendency.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

At the Greenock Police Board, on Tuesday last, the report of the secretary of the Corporation Gas-Works was submitted. It showed that during the month of January the average quality of the gas had been equal to 31·99 candles. The Gas Committee recommended that no reduction in the price of gas should be made for the present. One of the commissioners thought that the price ought to be reduced, and another member of the board said that the price could easily be reduced if the consumers would consent to a reduction in the standard of quality. The Provost, who presided, said the Gas Committee had fully considered the matter of a reduction of price, and had come to the conclusion that it was impossible at present to reduce the price. Members of the board who were not satisfied must call at the works, where they would find all the reasons that justified the action of the committee. In the course of the discussion it was stated that the Gas Commissioners had to pay £2000 per annum to the Police Board, and that the profits at present were not as great as in some previous years, and hence, as the commissioners were compelled to lay aside a sinking-fund, it would be wrong to compare the present state of things with the former. At the same meeting it was resolved to expose for public sale the ground in Roslin Street belonging to the Gas Commissioners, the upset price being £4750.

On Tuesday last the Town Council of Edinburgh had another report laid before them from Mr. J. Falconer King, the city analyst, in reference to the gas supplied to the city on the 18th of February. The report stated that the Edinburgh Company's gas had an illuminating power of 27·30 standard candles, while there were distinct indications of the presence of ammonia, but none of hydrosulphuric acid; and that the Edinburgh and Leith Company's gas had a similar illuminating power, and contained no traces of hydrosulphuric acid, but some of ammonia.

Considering that many gas managers have their professional eyes directed upon Dundee as a place where gas-making has attained a high degree of excellence, I may be permitted to go back upon an omission which I made last week when referring to gas affairs in that town. Following the plan which I have pursued for some time, I ought to have given a few statistics regarding consumption of coal and amount of gas produced. The amount of coal carbonized during December was 4226 tons 18 cwts., while the gas made during that month amounted to 46,801,400 cubic feet, or about 11,080 cubic feet per ton of coal. The average illuminating power of the gas produced during January was 28·06 candles, observations and testings being made on eight different days.

At the last meeting of the Town Council of Dunfermline, Mr. Hawksley's report on the water supply was read. The signatures to the petitions in favour of the Craigluscar and Devon schemes were scrutinized by a committee of the council, when it was found that the petition in favour of the Devon scheme was signed by 1872 ratepayers, and 186 non-ratepayers; that in favour of the Craigluscar scheme being signed by 2038 ratepayers, and 290 non-ratepayers; while the ratepayers signing both were 674. The assessable value of the property represented by the Devon ratepayers was £23,491 3s. 8d.; ditto Craigluscar, £12,334 14s. 2d.

A report was submitted to the Greenock Water Trust a few days ago, which showed that there were upwards of 496 million cubic feet of water in store in the various reservoirs, or 141 days supply for all purposes. The consumption during January was 68 gallons per head per day, taking the population at 65,000. The rainfall from the 1st to the 29th of January was 5·57 inches.

On Tuesday last the new water supply undertaking for the town of Beith was consummated by the performance of the ceremony of turning on the water. There were great rejoicings. The gathering-ground is 300 acres in extent, and 200 feet above the level of the town, and the reservoir covers an area of about eight acres, while it is capable of containing about 10½ million gallons of water. The arrangements are calculated to give a supply of 54 gallons per head per day. The engineer of the undertaking was Mr. W. R. Copland, C.E., Glasgow.

During the past week prices have been very low in the Glasgow pig iron market, and comparatively little business has been done. On Friday, as low as 60s. 7½d. cash was taken. There has been a reduction of 2s. per ton on some brands of makers iron, and 1s. on others.

The only change to note in the coal trade is an increase of the dulness which has been such a marked feature during the winter. Owners are pressing their coals upon the market, at, in many cases, a reduction in price. It is fully expected that a number of the collieries will soon be temporarily closed.

GLASGOW CORPORATION GAS-WORKS.—In the report sent to us last week, of the *soirée* given to the *employés* at these works, the Lord Provost was made to say that the quantity of gas supplied last year was 165 million cubic feet. The poor reporter, as usual, is blamed; he ought to have said 1650 million; but his mistake was nought.

FATAL GAS EXPLOSION AT LEEDS.—The coroner's inquest respecting the death of Mr. Levi Monk, who was killed by an explosion of gas at the Midland Railway Station, Leeds, on the 10th inst., was resumed on Wednesday last. After hearing evidence of persons on the spot at the time of the accident, the coroner adjourned the inquiry until the 8th prox.

GAS EXPLOSION AT WOLSTANTON. — A fatal explosion of gas occurred on Thursday morning last at the residence of Mr. Richard Edwards, Wolstanton. A servant girl went into a room, carrying a lighted candle in her hand. There had evidently been an escape of gas during the night, for her entrance was immediately followed by an explosion, which killed the unfortunate girl, and blew out the windows of the room.

LAUNCESTON GAS COMPANY, LIMITED. — The first yearly meeting of this company was held on the 14th inst.— Mr. J. Ching, chairman of directors, presiding. The accounts showed a profit of £609 on the year's working, or about 12¼ per cent. on the capital subscribed. The directors, however, recommended a dividend of 5 per cent. only, carrying the remainder (£369) to a reserve-fund, as a working capital, and to provide against any contingencies that may arise. It was resolved, on the motion of the chairman, seconded by Dr. Thompson, that the report and accounts be adopted, and a dividend of 5 per cent. was declared.

MELTON MOWBRAY GAS COMPANY.—The half-yearly meeting was held on the 11th inst.—Mr. Fitton in the chair—when the accounts presented were considered to be satisfactory. The report from the engineer, Mr. Lomes, was of a very favourable character, and he stated that with the contemplated extension in the shape of purifying appliances, and the replacing of the retorts (which he thinks ought to be done next summer), the works will be in an admirable state of efficiency. The directors report was adopted, and their recommendation of a dividend of 20s. for the half year ending the 31st of December was unanimously passed. A vote of thanks to the chairman and directors concluded the business.

BROMSGROVE GAS CONSUMERS COMPANY.—The report of the directors presented at the meeting of shareholders on the 14th inst., stated that the 2000 additional shares of £1 each, raised a few months ago, had enabled the directors to pay off their mortgage debt of £800, renew a large portion of the principal mains, and enlarge the principal gasholder. Although the expenses had been extremely heavy, and a reduction had been made in the price of gas of 4d. per 1000 feet, there was an available balance of £575 for dividend, which at the rate of 7½ per cent. was declared payable after the 1st prox.

CHATHAM AND ROCHESTER GAS COMPANY.—The half-yearly meeting of shareholders was held on the 10th inst.—Mr. E. Winch in the chair. The report of the directors recommended a dividend at the rate of 10 per cent. per annum on the £50 shares, 7 per cent. each on the £12 10s. and £3 6s. 8d. shares, and 10 per cent. on the £8 10s. shares. The Rev. F. J. Rawlins, Alderman E. R. Coles, Mr. E. Winch, and Mr. J. Levy, were re-elected directors, and Mr. W. Homan, auditor. In the evening the directors and shareholders, with a few invited guests, including the Mayor and the High Constable, sat down to a sumptuous dinner at the "Crown" Hotel, Rochester Bridge.

NEW RIVER COMPANY. — At the Auction Mart, on the 15th inst., Messrs. Farebrother, Ellis, Clarke, and Co., disposed of "Three Twenty-fourths of a Fourth of a King's Share" in this company, for the sum of £2000. This property was described as a freehold consisting of three twenty-fourths of a fourth of a King's Share (equal to one thirty-second part of a thirty-sixth share of the King's Moiety) in the estates and interest of the New River Company. The income produced from this interest in 1868 was £20 17s. 6d., but it has gradually increased since that year, until now it amounts to £68 14s. 4d. The owner has also a right to vote for the counties of Middlesex and Hertford. The term "King's Moiety" arises from the fact, that when the New River was constructed by Sir Hugh Myddelton, King James I. advanced half the capital, and out of the 72 original shares he received 36. Eventually these shares were granted to the company, on their agreeing to pay an annuity of £500.

REDHILL GAS COMPANY.—The annual meeting was held on the 17th inst. The directors in their report congratulated the shareholders upon the satisfactory state of the affairs of the company, as shown by the balance-sheet, from which it was apparent that a steady increase was taking place in the business of the company. The directors had used their best efforts to keep the cost of the manufacture and distribution of gas within due limits, and also to dispose of the

residual products in the most advantageous manner. The supply of coal, and the grave questions at issue between the coalowners and miners, had received their anxious attention, and they had been enabled to make satisiactory contracts for the supplies required by the company. The works, plant, and machinery had been maintained in an efficient state during the past year, and were in excellent order. Some of the retorts in one of the houses had been renewed and set in an improved manner, the result being advantageous in carbonizing; and it was intended, during the ensuing summer, that the remainder of the retorts in that house should be similarly renewed. Attention having been drawn in other towns to the important question of the illuminating quality of their gas supply, the directors had been induced to devote especial care to the quality of the gas manufactured by this company, and they had reason to believe that the high illuminating quality of the gas supplied to their consumers, which was considerably above the standard fixed by the company's Act, had been appreciated by them. The balance-sheet showed a net profit of £2394 6s. 9d., out of which the directors recommended a dividend of 10 per cent. upon the paid-up capital. An interim dividend of 4 per cent. was paid in September last, leaving 6 per cent. to be paid on the 1st of March next, and a balance of £82 10s. 9d. to be carried forward. The guarantee-fund now amounts to £1776 17s. 4d.

Blackrod Gas Company.—The half-yearly meeting of shareholders was held on the 16th inst.—Mr. T. Lowe in the chair—when the following report was read by the secretary (Mr. T. Saunders), and adopted:—"It will be seen that the profit and loss account shows a profit of £130 19s. 6½d.; and, when it is considered that the sums (viz., charges account £250 6s. 5d., reserve-fund £73 3s. 2d., and that £50 be taken from the capital account and carried to revenue, on account of Scott Lane renewal) which were ordered to be struck off the balance-sheets, at the last meeting of shareholders, have been paid out of the profits of the last year, the directors consider that the results of the year's working are highly satisfactory, and they recommend that a dividend at the rate of 2s. 6d. per fully paid-up share be declared, and payable on and after Feb. 22, 1876. The present works are beginning to be found too small for the requirements of the district, and several additions have been made during the last half year; and the directors recommend considerable extensions being made forthwith, and, amongst other things, they would recommend the putting down of another gasholder, 80 feet in diameter, by 20 feet deep. At a meeting of the shareholders, held on the 8th of September last, it was resolved to apply to Parliament for a bill to incorporate the present company, and to extend their works and district, which latter comprises Blackrod and several neighbouring townships, and Messrs. Darlington and Sons, of Wigan, were instructed to make the application. The bill has passed the Examiners of Standing Orders, and was read the first time in the House of Lords on the 15th inst., and it is contemplated that there will not be any material opposition to it; and, if obtained, of which there is little or no doubt, the company will be placed on a safe basis, and it will give them full statutory rights and powers for the manufacture and supply of gas. To meet the expenses connected with the proposed extensions and new works, the capital of the company has been increased from £8000 to £12,000, by the issue of 800 new shares of £5 each, and immediately thereupon 455 of these sharse were taken up, and a deposit of 5s. per share paid thereon. The accounts for the past half year compare favourably with any since the formation of the company, and show a steady increase in the demand, and the directors have every confidence in the permanent prosperity of the company."

Peterborough Gas Company.—The ordinary half-yearly meeting was held on the 15th inst.—Mr. W. Harris in the chair. The directors, in their report, congratulate the shareholders on the excellent results shown in the statement of account presented. On the revenue account for the half year ending the 31st of December there was a balance of £2117 11s. 5d. The balance of the profit and loss (including the balance of the preceding half year) amounted to £2334 12s. 7d., out of which, after providing for the payment of the preferential dividend on the £5 per cent. new preference "A" shares, the directors recommended the payment of a dividend at the rate of £10 per cent. per annum on the ordinary share capital, and £7 per cent. per annum on the new ordinary and new ordinary "A" share capital of the company, free from income-tax, payable on the 21st inst. This would absorb £1768 6s. 1d., leaving a balance of £566 6s. 6d to be carried forward to the next half year's account. The directors reported that several extensions of mains had been made during the past half year; and by order of the corporation, further extensions were about to be undertaken on the Springhill estate, and in other parts of the borough. These extensions would be carried out during the ensuing summer. In consequence of the steady growth of the company's business, and the great need for additional yard accommodation at the works, the directors had thought it expedient to put in force the powers of the company's Act of 1874, for acquiring the additional land adjoining the works, as scheduled under that Act, and steps had been taken which would enable the company to obtain possession thereof at an early date. The capital authorized to be raised at a recent meeting of shareholders had been fully taken up, and the shares for the same allotted. The directors stated in conclusion that the time had now arrived when they could, with due regard to the interests of the shareholders, approach the question of reduction in the price of gas. They proposed, therefore, unless exceptional circumstances should intervene, to make a reduction of 4d. per 1000 cubic feet, from the 1st day of July next.

Wakefield Water-Works Company.—The half-yearly meeting was held on the 11th inst.—Mr. Statter in the chair. The directors in their report recommended the payment of the usual dividend of £9 per cent. per annum upon the old capital of the company, and the guaranteed dividend of £5 per cent. per annum upon the £10 shares. This required £278 6s. to be taken from the reserve-fund, which will then amount to £1702 17s. 4d. The directors stated that they had pleasure in reporting that their bill in Parliament had already passed the Examiner on Standing Orders, and was likely to be obtained without any serious opposition. The receipts for the half year for water-rents, &c., amounted to £4966 19s. 4d. The expenditure was £1403 15s. 6d., leaving the balance of profit £3563 4s. To add to this there was a balance or reserve of £1981 3s. 4d. from last account, making the total sum at disposal £5544 7s. 4d. The dividend on the paid-up capital of £68,700, at the rate of £9 per cent. per annum, absorbed £3091 10s., and it required £750 to pay the guaranteed dividend of £5 per cent. per annum on the £10 shares, making together £3841 10s., and leaving the remainder, or £1702 17s.4d., as a reserve-fund, against £1981 3s. 4d. at the end of last half year. In moving the adoption of the report, the chairman stated that the profit was rather less last half year than in the corresponding half of 1874, for whilst the expenditure was £150 18s. 10d. more than it was a year ago, their income was pretty much about the same. They had paid about £100 more for interest, and the rent and taxes had increased by about £40. They had also about £75 more to pay for interest or dividend on capital, as another call had been made. Altogether, they had £225 less to divide amongst the shareholders than they had a year ago, and, as their report stated, they had to take £278 6s. from the reserve-fund, in order to pay the usual dividends. They could well afford to do that this half year, but it would not be advisable to resort to the reserve-fund too frequently. The new valuation of property in the town had increased their rating by £12,000, and at 1s. in the £1 on their rents that would increase their income by £600 per year. If they got that extra amount they would be able to maintain their ordinary dividends without having to repeat the process of dipping into the reserve-fund. The income from small or ordinary customers was more, but the amount received in meter-rents from large manufacturers and others was rather less. Their income had not increased very much, but it was something more than a year ago, as small customers had taken considerably more water. New mains had been laid in Thornes Lane, Grove Road, and other places, at a cost of £608 7s. 2d., meters and sluices had cost £84, and they had also paid £2090 3s. 3d., the balance of about £3000, for the new filters at Stanley. The filters were now in full operation, and the directors believed they were well worth the outlay they had cost. The water was now much better than it used to be, as it is now twice filtered—once at Stanley and once at Field Head. The boring at Heck had cost £783 10s. 3d.. and the water at that place had been thoroughly tested. Their parliamentary expenses in connexion with the Langsett and Holmforth schemes were £3304 19s. 10d. The motion was carried unanimously, and the dividends, as recommended in the report, were declared. An Extraordinary or Wharncliffe meeting was then held, for the purpose of considering the company's application to Parliament for power to raise £80,000 additional capital, and to obtain a supply of water from Darfield, near Barnsley, which was approved.

Birmingham Corporation Water Supply.—At the Town Council meeting on the 15th inst., the Water Committee reported that Mr. John Gray, the engineer of the Corporation Water Department, had recommended the construction of a conduit and open water channel for conveying the water of the river Bourne to the filter-beds at Whitacre, for which the necessary pipes had been already purchased by the late Water-Works Company, and the same would be a portion of the permanent works required to be constructed in connexion with the proposed reservoir at Whitacre. The engineer had further reported that he estimated the cost of such works at the sum of £4100. The committee recommended that they be authorized to obtain tenders for the execution of the conduit and open channel. Alderman Avery moved that the report be approved, and that the committee be authorized to enter into contracts for the work as recommended by the committee. He said the Council would be exceedingly desirous to know at the earliest possible moment the first substantial results of the operations of the Water Committee. Hitherto they had only had estimates, and now for the first time they had ascertained, in as accurate a manner as possible, the results of carrying on the affairs of the water-works for the past half year. By the 11th section of the Birmingham Corporation Water Act, 1875, it was provided that the payment of the dividend to the shareholders of the late company for the half year should be a liability of the Corporation. The shareholders were entitled to their actual dividend, and the Corporation were liable for the payment of it. The maximum dividend receivable by the late company was 8 per cent. upon part of the capital, and 7 per cent. on another part, amounting to £25,212 0s. 6d. The actual earnings for the half year were £27,612 16s. 2d., which, with a balance carried forward from June 30, 1875, of £1163 0s. 5d., made a total applicable for distribution of £28,775 16s.7d. Deducting from this the maximum dividend of the company of £25,212 0s. 6d., there was a clear surplus to the Corporation of £3563 16s. 1d. He trusted this would be satisfactory to the Council, inasmuch as it showed that they had not made an imprudent bargain; and if no very distinguished success, in the shape of profits, was likely to be realized, at all events this great department was likely to be carried on without any loss to the ratepayers. The accounts from which he gave the figures were unaudited, and were, therefore, subject to some revision; but he did not apprehend that any material alteration would be necessary. With regard to the conduit, it consisted partly of the open length of 1450 yards and the covered channel of 600 yards, and would be constructed of large pipes 36 inches in diameter. The total length would be about a mile. The Water-Works Acts of 1870 gave the late company power to construct a reservoir of vast dimensions at Whitacre, and for that purpose the company purchased about 155 acres of land, at an expense of about £34,000. It was not proposed to proceed immediately with the construction of that reservoir, because there was no pressing necessity. The statute authorizing the reservoir to be made imposed the obligation that if the reservoir should be constructed a flood channel must be provided, and the conduit recommended would form a flood channel. The cost was estimated at £4100, and £4000 would be permanently useful. The greatest advantage would be derived from the conduit, because it would convey 2 million gallons of water daily from the waters of the Bourne. Alderman Brinsley seconded the motion, and it was carried.

Register of New Patents.

770.—Clark, A. M., Chancery Lane, London, "*Improvements in gas-meters.*" A communication. Patent dated March 2, 1875.

This invention consists in the employment of pairs of oscillating gas-measuring chambers, dipping in water and working in separate compartments, the chambers communicating with opposite compartments in which the gas is caused to alternately flow in and out by slide valves, the measuring chambers being alternately filled and emptied. Instead of slide valves, oscillating hydraulic valves of particular construction may be used, whereby friction is reduced to a minimum.

791.—Lawrence, J. E., and Porter, E. V., Parliament Street, Westminster, "*Improvements in centrifugal pumps.*" Patent dated March 3, 1875.

These improvements relate to that class of centrifugal pumps in which a revolving disc or wheel draws in water at its centre on both sides and discharges it at its periphery into a volute or delivery passage, which surrounds it, and thence into a discharge-pipe, and in which also two suction pipes or passages are led up from the bed on opposites sides of the volute, and terminate opposite to the centre of the revolving disc or wheel to deliver water to it.

793.—Justice, P. S., Southampton Buildings, London, "*Improvements in valves.*" A communication. Patent dated March 3, 1875.

This invention consists in the construction of a valve with a plunger or piston head projecting from its seat, and in the provision of a hydraulic packing above the top of the valve. The object of the invention being to enable a rapid stroke of the valve under high pressures without danger from pounding or injuring the seat of the valve.

797.—Elborough, C. M., King's Arms Yard, London, "*An improved meter for liquids.*" A communication. Patent dated March 4, 1875.

This improved meter is similar to the ordinary machines now in use, but is furnished with two fan wheels of vulcanized india-rubber, with a common metal axle, working into each other as cog wheels. An endless screw on the common axle connects with an ordinary marking apparatus. The machine is regulated by admitting the liquid to the wheel box (which is enclosed in glass) through a second tube, in proportions regulated by screws. The machine is supplied with a waste-box constructed as an ordinary stop-cock, with hollow pivot containing a cap divided by a metal strainer, which pivot can be turned to such an angle that all foreign elements will be retained, and the liquid flow pure through the machine.

806.—Wier, M. A., Abchurch Lane, London, "*Improvements in the means of igniting gas and in apparatus employed therein.*" Provisional protection only obtained. Dated March 4, 1875.

This invention relates to the ignition of gas by a current of electricity, and is especially applicable to the ignition of gas at the burners of the lamps in railway carriages, street-lamps, factories, houses, and other places where large numbers of gas-jets are employed.

It consists in employing, for the purpose of generating the requisite current of electricity, a magneto-electric machine, which, where machinery is employed, may be set in motion by any suitable and convenient revolving part of such machinery, such as an axle or shaft, and in the case of houses where machinery is not employed, by means of a winch turned by hand, or by any other suitable means for imparting rotary motion.

In order to effect the lighting of the gas by means of the electric current gene-

rated in the machine, the conducting wire usually employed is led from one pole of the electric machine to the nearest gas-burner, and thence consecutively from burner to burner until the last is reached, when the wire is then returned direct to the other pole of the electric machine. The wire connected with the burners is severed at each, and again united by short pieces of platinum wire, which cross the burners at a convenient distance, or the severed ends of the wire may be placed nearly close together without the platinum wire between them, and near the orifice of the burner, but it is preferred to employ the platinum wire. It will be understood that the conducting wire must be insulated from the burners and other electric conductors in the usual manner. The current from the electric machine either heats the platinum wire red hot, or causes a spark to pass between the severed ends, in either case igniting the gas when required.

The light is extinguished by turning off the gas by means of a main-cock regulating the supply to the entire series of burners. This arrangement is applicable to railway carriages, street-lamps, and other circumstances where it is required to, or will not be inconvenient to, light or extinguish all the burners simultaneously, and in which the gas may be turned on to the burners from a main-cock without danger. But in the case of factories, houses, and other circumstances in which it would be unsafe so to regulate the supply of gas, or where it is not required to light all the burners at once, connexions for the severed ends of the conducting wire are so employed with the ordinary regulating cocks of the burners, that on opening the latter the severed ends or connexions attached thereto are separated, or break contact, allowing a spark to pass between them to ignite the gas; whilst, when the regulating cocks are shut or turned into certain positions after the lighting is effected, the severed ends or connexions attached to them remain in contact, and the electric current passes through them without producing a spark.

807.—ELCOCK, C., Manchester, "*An artificial animal charcoal suitable as a filtering, decolorizing and deodorizing agent*," Provisional protection only obtained. Dated March 4, 1875.

The features of novelty in this invention consist in making an artificial animal charcoal from a mixture of clay and sawdust, or clay and dissolved gelatinous animal substances, such as glue, gelatine, or size, and then charring the mixture; such charcoal being capable of production either in a granular form, or in the form of slabs, plates, or blocks, or in any other desired form.

812.—CLARK, A. M., Chancery Lane, London, "*Improvements in pumps.*" A communication. Patent dated March 4, 1875.

This invention consists principally in the application of a hinged tongue or diaphragm to, and within, a segmental submerged pump chamber, serving as it is moved up and down—*i.e.*, vibrated in the chamber—to draw water into the same through the inlet apertures and to eject it at the outlet. Another feature has reference to the mechanism, by which power is transmitted from a rotary driving shaft to the reciprocating pump-rod.

APPLICATIONS FOR LETTERS PATENT.

562.—BRAY, H., Stoke Newington, and GROOM, E., Russell Square, London, "Improvements in the production of gas for illuminating and for heating purposes." Feb. 11, 1876.

629.—BENSON, M., Southampton Buildings, London, "Improvements in steam-valves for steam pumping machinery and the manner of working the same." A communication. Feb. 16, 1876.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

2888.—PACKER, O., Westminster, London, "Improvements in double-slide box cocks." Aug. 17, 1875.

2905.—DUCKHAM, H. A. F., Holloway, London, "Improvements in gas-regulators, more especially applicable for regulating the supply of gas to the burners of railway and tram carriages." Aug. 18, 1875.

2961.—TONGUE, J. G., Southampton Buildings, London, "Improvements in rotary steam, air, or gas engines." A communication. Aug. 25, 1875.

2994.—BEACH, H., Brighton, "Improvements in taps known as high-pressure water-taps." Aug. 26, 1875.

3034.—DUNCAN, R., Madeley, Salop, "Improved apparatus for pressing and moulding, especially useful for making bricks, roofing and flooring tiles, and clay pipes." Aug. 28, 1875.

3143.—LAKE, W. R., Southampton Buildings, London, "An improved engine to be operated by steam, hot air, or water, and which may also be used as a pump or a fluid meter." A communication. Sept. 7, 1875.

3269.—FIELD, E., Adelphi, London, "Improvements in pumping machinery." Sept. 18, 1875.

3526.—CLARK, A. M., Chancery Lane, London, "Improved automatic gas lighting and extinguishing apparatus." A communication. Oct. 11, 1875.

4051.—CAMERON, J., Salford, "Improvements in the construction of steam-pumps." Nov. 22, 1875.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

430.—TAYLOR, J., BUCKLEY, S., and CHADWICK, T. H., "Improvements in machinery or apparatus for drawing and charging retorts used in the manufacture of illuminating gas." Feb. 5, 1873.

450.—MAQUAY, S. W., "Improvements in the construction of furnace retorts to be employed in connexion with other apparatus for the manufacture of gas." Feb. 7, 1873.

518.—RICHARDS, W., "Improvements in machinery and apparatus for charging and drawing retorts used in the manufacture of gas." Feb. 12, 1873.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

GWYNNE & BEALE'S PATENT IMPROVED GAS-EXHAUSTERS,

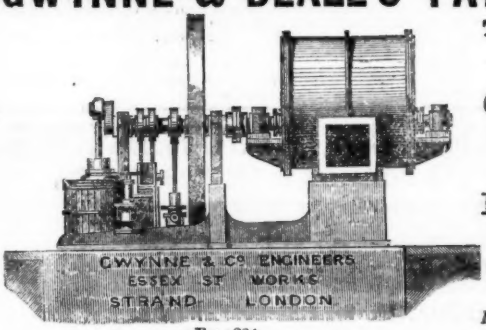

FIG. 224.

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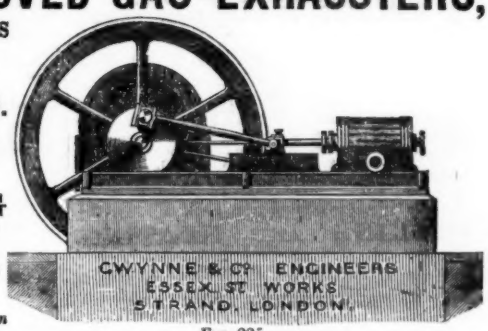

FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND CO. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

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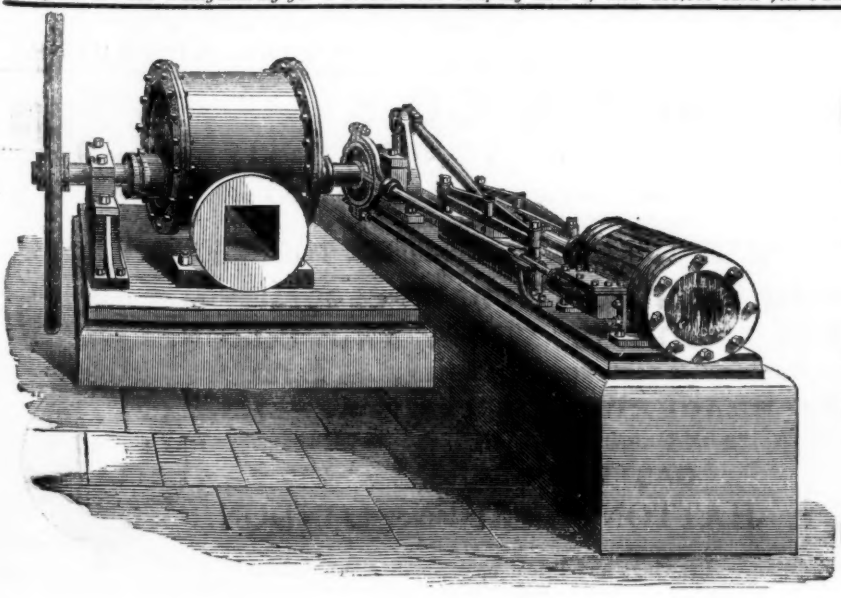
G. & Co. are now manufacturing for a London Gas Company three of their 210,000 cubic feet Patent Gas Exhausters, and many of all sizes.



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WITH

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TAR, LIQUOR, and other PUMPS,
SCRUBBERS and PURIFIERS,
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HOLLAND STREET, S.E.,
AND
STROUD, GLOUCESTERSHIRE.

WANTED to purchase, Two second-hand PURIFIERS, with valves and lifting gear complete. Connexions 4-in.
Particulars to be sent to P. SIMPSON, RUGBY.

WANTED, by the Advertiser, a situation as METER INSPECTOR, Fitter, Fixer, Service Layer, &c.
Address J. S., care of Mr. Smith, 60, Cornwall Road, Lambeth, LONDON.

WANTED, by a Working Manager of a Gas-Work, a SITUATION. Can do main and service laying, meter fixing, gas-fitting, setting of retorts, clay or iron. Twelve years testimonials. Abroad preferred.
Address No. 244, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a re-engagement as MANAGER of Gas-Works, where the make is from 15 to 30 millions. Thoroughly efficient. Highest testimonials and references from present and previous employers.
Address, in first instance, to No. 247, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Chesterfield Water-Works and Gaslight Company, a LEADING FOREMAN. Must be a good carbonizer, accustomed to the management of workmen, and the whole routine of a provincial Gas-Work.
Also several MAIN-LAYERS, used to gas and water pipes of large and small sizes.
Applications, by letter only, to be addressed to CHARLES EDWIN JONES, Manager.
Gas-Works, Chesterfield, Feb. 19, 1876.

LEEDS CORPORATION GAS-WORKS.

WANTED, an experienced DRAUGHTSMAN. Salary £100 per annum.
Applications, with testimonials, addressed to the Chairman of the Gas Committee, Town Clerk's Office, Town-Hall, and endorsed "Draughtsman," will be received not later than Wednesday, the 15th day of March next.
By order,
C. A. CURWOOD, Town-Clerk.
Leeds, Feb. 21, 1876.

REQUIRED, a steady Man as Stoker (one who has a knowledge of steam-engine preferred). Wages 24s. 6d. per week. Overtime paid.
Apply, in own handwriting, to Mr. T. H. BOUTTELL, Gas-Works, SLEAFORD.

WANTED, GAS-WORKS ON LEASE.

A MANAGER, of many years experience, wishes to LEASE a small Gas-Work. A fair interest will be given.
Address No. 249, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS COMPANIES AND OTHERS.

EMPLOYMENT WANTED by a thoroughly practical gas-fitter. Can fix mains and service-pipes, and is accustomed to taking index of meters.
Address GAS-FITTER, care of Messrs. Lightfoot, 3, Arthur Street East, LONDON BRIDGE.

ADVANTAGES OF GAS FOR

COOKING AND HEATING.

HINTS ON GAS BURNERS, &c.

By MAGNUS OHREN, A.I.C.E., F.C.S.

Specimen Copy by post Threepence, direct from MAGNUS OHREN, Gas-Works, Lower Sydenham, London, S.E.

WANTED, by the Advertiser, a situation as MANAGER of a medium-sized Gas-Works, or Outdoor Superintendent, Inspector, &c. Thoroughly conversant with the manufacture of gas and the general duties of a Manager, and can be well recommended by several Engineers.
Address No. 248, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ON SALE, cheap, Four second-hand PURIFIERS, 10 ft. square, with dry centre-valve and lifting gear. Thorncliffe make.
Apply to Mr. LONGWORTH, Dukinfield, MANCHESTER.

FOR SALE—Vertical Pipe Condensers, 3-in. diameter; also a number of Circular MOUTHPIECES, all second-hand, and in excellent condition.
Apply to J. HEPWORTH, Gas-Works, CARLISLE.

FOR SALE—A 6-in. Governor, in good condition. Now replaced with a larger one.
Apply to Mr. W. DUFF, Manager, Gas-Works, MORECAMBE.

FOR SALE, in consequence of enlargements, Two PURIFIERS, 6 ft. square, with valves grids, covers, and lifting crane complete. Also Vertical Condenser, 8-in. pipes and chest, in good order.
Apply to W. EWART, Gas-Works, ANNAN, N.B.

TENDERS will be received by the Redditch Town and District Gas Company, Limited, for the supply of the following lengths of cast-iron Spigot and Socket GAS-MAINS, to be delivered free to Redditch Railway Station.
1340 yards of 10-in. diameter in 9-ft. lengths.
740 yards of 8 „ „ „ „
500 yards of 4 „ „ „ „
Tenders must be sent in on or before Saturday, the 4th day of March next, addressed to the Company's Offices, 10, Church Green West, Redditch.
The Directors do not bind themselves to accept the lowest or any tender.—By order of the Board,
T. LATTON, Secretary.

TO PLUMBERS, &c.

THE Aberdare Local Board of Health are desirous of receiving TENDERS for the supply and fixing of SERVICES, both inside and outside, with Taps, to about 2050 houses, more or less. The approximate length of piping required will be about 25,000 ft., and must be of such weight per lineal yard as may be fixed by the Engineer.
Tenders to be sent to me, endorsed "Tender for Services," &c., on or before Wednesday, the 1st of March, 1876.
The Board reserve to themselves the right to reject the whole or any tender.
R. ORTON GERY, Clerk.

TO CORPORATIONS, GAS COMPANIES, & OTHERS.

TO BE DISPOSED OF, by Private Contract, 100 perfectly new, and never used, cast-iron fluted pattern public LAMP COLUMNS; 200 tinned copper Public Lamps, and 70 wrought-iron ornamental scroll pattern Lamp Brackets, all complete.
For particulars as to price, &c., apply to J. L. COCKER, Gas-Works, Merthyr Tydfil, GLAMORGANSHIRE.
Feb. 21, 1876.

THE Newport (Mon.) Gas Company have for SALE a Telescopic GASHOLDER, inner lift 49 ft. diameter, outer lift 50½ ft., each lift rising 11 ft. when filled; working capacity 40,000 cubic feet, with columns, girders, counterbalancing weights, &c., complete.
The Holder is almost new, is in excellent working condition, and only removed in consequence of alterations.
Further particulars to be obtained from THOMAS CANNING, Engineer, Gas-Works, Newport, MON.
Newport (Mon.) Gas Works, Feb. 12, 1876.

TO MANUFACTURING CHEMISTS AND OTHERS.

THE Carlisle Corporation Gas Committee are prepared to receive TENDERS for the surplus TAR to be produced at their works, during a term of Three, Five, or Seven years, commencing July 1, 1876. The Tar may be delivered into tanks on rails.
Any further information can be obtained from the undersigned, to whom sealed tenders, endorsed "Tender for Tar," are to be sent on or before March 9, 1876.
J. HEPWORTH, Manager.
Gas-Works, Carlisle, Feb. 12, 1876.

TO BUILDERS AND CONTRACTORS.

THE Directors of the Cleethorpes Gas Company invite TENDERS from parties willing to undertake the erection of a GASHOLDER-TANK and DRY WELL, in accordance with plan and specification, which may be seen on application to Mr. A. Downie, Gas-Works, Cleethorpes.
Tenders to be delivered to me on or before Thursday, the 24th inst., endorsed "Gas-Tank."
WM. HEAFORD DAUBNEY, Secretary.
Great Grimsby, Feb. 5, 1876.

TO MANUFACTURING CHEMISTS AND OTHERS.

THE Directors of the Victoria (Newmarket) Gaslight and Coke Company, Limited, invite TENDERS for the whole of the AMMONIACAL LIQUOR produced at their works, for One or Two years, from the 1st day of March next, as may be agreed upon, and for the Ammoniacal Liquor at present in stock—namely, upwards of 20,000 gallons.
Particulars may be obtained on application to the undersigned, to whom tenders are to be addressed on or before the 28th of February inst.
The Directors do not bind themselves to accept any tender.
By order,
THOMAS WILKINSON, Manager and Secretary.
Newmarket, Suffolk.

JOHN HALL AND CO., STOURBRIDGE,
Manufacturers of FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.
N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

D. BRUCE PEEBLES & CO.,
ENGINEERS,
FOUNTAINBRIDGE WORKS, EDINBURGH,
MANUFACTURERS OF **WET AND DRY GAS-METERS;**
Patentees and Sole Manufacturers of PEEBLES' LAMP-GOVERNORS,
ABOVE 30,000 OF WHICH ARE NOW IN USE.
"These Lamp-Governors are so superior that they are likely to supplant all others."—*Dr. Wm. Wallace, F.R.S.E., F.C.S.*
D. BRUCE PEEBLES AND CO., FOUNTAINBRIDGE WORKS, EDINBURGH.

HODGE & CO.'S
IMPROVED VENTILATING SUN-LIGHTS
WITH TALC REFLECTORS AND SELF-ACTING VALVES
TO PREVENT DOWN-DRAUGHT;
VENTILATING GLOBE LIGHTS for DINING-ROOMS, LIBRARIES, &c.
Ormolu, Bronze, & Crystal Gaseliers;
MEDIÆVAL CHURCH WORK AND CORONÆ
COCKS, VALVES, and FITTINGS for GAS, STEAM, and WATER;
COLUMNS, BRACKETS, & STREET LANTERNS;
BLACK AND GALVANIZED BARREL COMPO AND TIN PIPE.
GAS ENGINEERS,
100, HATTON GARDEN, LONDON.

Drawings and Prices upon application.

C. & W. WALKER,
8, Finsbury Circus,
London, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the im-portant results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

They are, in all cases, constructed under guarantees to perfectly perform their work. They are now extensively used in the largest gas-works of London and the chief cities of Europe, the number in use exceeds **one hundred,** and their perfect efficiency and profit to a gas company have been fully established with every variety of coal used in Europe. References can be given to the largest gas-works in Europe.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, re-quiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. and W. Walker, 8, Finsbury Circus, London, E.C., or to Mr. William Mann, late Superintendent of the Chartered Gas-Works, Blackfriars, London; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

IMPERIAL GASLIGHT AND COKE COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY GENERAL MEETING of the PROPRIETORS of this Company will be held at No. 33, John Street, Bedford Row, London, on FRIDAY, the 25th of February inst, at One o'clock precisely, to receive the Report of the Directors and the Accounts of the Company, and to declare a Dividend for the half year ending the 31st of December last, and to elect six Directors and one Auditor in the room of those retiring from office by rotation, but who are eligible for re-election, and will offer themselves accordingly, and for other business of the Company; and further NOTICE is hereby given that a Special General Meeting of the Proprietors will be held at the same address immediately after the above Meeting, for the purpose of considering and, if so determined, of approving the following Bill, for which application is intended to be made to Parliament in the present session; that is to say, "A Bill to authorize the Imperial Gaslight and Coke Company to raise more money and amalgamate with certain of the Metropolitan Gas Companies, and for other purposes."

By order, HARRY CHUBB.

Offices of the Company, Nos. 33 and 34, John Street, Bedford Row, London, Feb. 4, 1876.

TO BE LET UPON LEASE, from the 25th day of March next, the GAS-WORKS at Herne Bay. The town is fast improving, and likely to become a very fashionable watering-place. This is an opportunity well worthy of the attention of Gas Makers. There is at present a good business attached to the works, which may be considerably increased.

For particulars apply to Mr. H. E. NEWTON, Secretary to the Company, at No. 66, Chancery Lane, LONDON.

The freehold to be disposed of if required.

Sealed tenders to be sent to the Secretary on or before the 7th day of March.

THE Sheffield United Gaslight Company have for SALE the following Articles:—

The whole Manufacturing Plant, Gasholder, and Governor, of a small Gas-Work, capable of producing 10,000 cubic feet of gas per day. The gasholder is 27 ft. diameter by 14 ft. deep, cubic contents 8000 ft.

Connexions for ditto.

Four Purifiers, 12 ft. square, with 10-in. centre-valve and connexions.

Two Jones's Exhausters, each to pass 25,000 cubic feet per hour, with valves and connexions, in good condition.

Two 7-in. Governors.

One Battery Condenser, 60 ft. long, 12 ft. high, and 2 ft. wide, with 14-in. connexions and valves.

Seven Lengths Hydraulic Main, 7 ft. long, 18 in. diameter.

Nine Lengths Hydraulic Main, 7 ft. long, 14 in. diameter.

Twenty-seven Dip-Pipes, 4 in. diameter.

Twenty-seven Bridge-Pipes, 4 in. diameter.

Full particulars as to quality and price can be obtained on applying to Mr. T. ROBERTS, the Manager, Commercial Street, SHEFFIELD.

OTTERY ST. MARY, DEVONSHIRE.

VALUABLE INVESTMENT, well worthy the attention of Gas Engineers and others retiring from active business. The important market town of Ottery St. Mary, which is situated in a beautiful and fertile valley on the eastern bank of the River Otter, from which it takes its name. There are several influential family residents, amongst others Lord Chief Justice Coleridge. There is a large lace mill, and a centre for the manufacture of Honiton lace.

The FREEHOLD GAS-WORKS of OTTERY ST. MARY for SALE, including the whole of the Buildings, Modern Plant, Mains, Meters, Service-Pipes, &c.

Price, particulars, and card to view the Works, can be had on application to THOMAS DAND, Gas, Water, and Consulting Engineer, Offices, Post-Office Chambers, Queen Street, Exeter, DEVONSHIRE.

AXMINSTER, DEVONSHIRE.

VALUABLE INVESTMENT, well worthy the attention of Gas Engineers and others retiring from active business. The important market town of Axminster, being beautifully situated; indeed, few towns richer than it is in objects of antiquity, in historical associations, and in lovely scenery—scenery varied in the most beautiful manner, with hills and dales, adorned with abundant timber, and watered by beautiful streams.

The FREEHOLD GAS-WORKS of AXMINSTER for SALE, including the whole of the Buildings, Modern Plant, Mains, Meters, Service-Pipes, &c.

Price, particulars, and card to view the Works, can be had on application to THOMAS DAND, Gas, Water, and Consulting Engineer, Offices, Post-Office Chambers, Queen Street, Exeter, DEVONSHIRE.

BIRSTAL LOCAL BOARD.

PORTIONS OF GAS PLANT FOR SALE.

THE Birstal Local Board are desirous of DISPOSING OF the following GAS PLANT, in consequence of the laying down of a larger plant at their Gas-Works.

Twenty-one Mouthpieces, 18 in. by 12 in., with ascension, H, and dip pipes, and Hydraulic Mains, 20 in. by 18 in.

Cast-Iron Roof, 63 ft. by 24 ft.

One Pipe Condenser, with 24 6-in. pipes and four valves.

One cast-iron Scrubber, 3 ft. 4 in. in diameter, and 16 ft. in height.

One wrought-iron Scrubber, 5 ft. in diameter and 20 ft in height.

One Gasholder, in good condition, 34 ft. by 12 ft., with six columns, chains, and weights, inlet and outlet pipes, and valves.

Two of Anderson's 10-in. Four-way Valves.

Tenders for the whole or any portion of the above to be sent to me, sealed, and endorsed "Tender for Gas Plant," not later than Four o'clock in the afternoon of Saturday, the 4th day of March, 1876.

The highest or any tender will not necessarily be accepted.

All articles to be removed immediately after the acceptance of the tender, to be paid for as may be agreed upon between the Local Board and the successful tenderers, and be at the entire risk of the parties tendering from the acceptance of the tender, of which notice will be given to the successful tenderers.

For further particulars apply to Mr. Robert Dempster, Gas Engineer, Elland, near Halifax (the Engineer of the Local Board), at the Gas-Works, Smithies, Birstal, near Leeds, or at my Offices.

JOHN SMITH, Solicitor,
Clerk to the Local Board.

Birstal, near Leeds, Feb. 19, 1876.

ALFRED WILLIAMS,

PHŒNIX FIRE-BRICK WHARF,

64, BANKSIDE, SOUTHWARK, LONDON, S.E.

GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS, AND FOR THE

SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,

AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

CLYDE TUBE WORKS, GLASGOW & COATBRIDGE.

OFFICES, 41, OSWALD STREET, GLASGOW,

ANDREW & JAMES STEWART,

MANUFACTURERS OF

WROUGHT-IRON WELDED TUBES AND FITTINGS,

GUN METAL & OTHER COCKS, ALL KINDS OF IRON & BRASS FITTINGS

For GAS, WATER, and STEAM;

CAST-IRON PIPES, CORE BARS for IRONFOUNDERS,

STOCKS, DIES, and TAPS, GAS PLIERS and TONGS, &c., &c.,

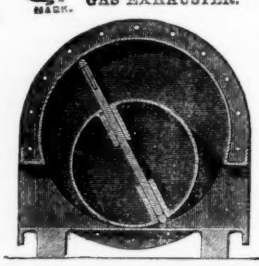
ALWAYS KEPT IN STOCK.

LAP-WELDED IRON BOILER TUBES,

As supplied to the English, French, and Dutch Admiralties, and principal Railways and Engineers at Home and Abroad.

TRADE MARK.

J. BEALE'S PATENT GAS EXHAUSTER.



BEALE'S CONTINUOUSLY ACTING

GAS EXHAUSTERS

ARE NOW MANUFACTURED BY

B. DONKIN & CO.

MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.

B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise, and Gas-Valves.

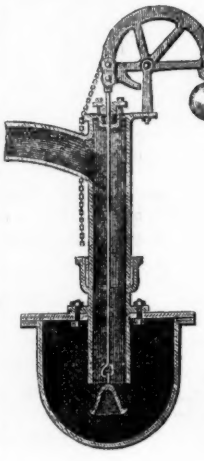
Estimates and Prices on application to

B. DONKIN & CO.,

ENGINEERS & IRONFOUNDERS,

55a, BLUE ANCHOR ROAD, BERMONDSEY,

LONDON, S.E.



BOX'S PATENT ANTI-DIP VALVE

Affords a clear gas way through the dip-pipe while the retort is in action, and produces a perfect seal at pleasure, or whenever the retort is open, offering absolute security against the drawing of air, however hard the engine is worked, and obviating the necessity for using any liquid in the now so-called hydraulic main, while it is at the same time capable of withstanding the heaviest back pressure. By its use, experience shows that the retorts are kept quite free from carbon. It is easy of application to existing apparatus, and is comparatively inexpensive. Is not likely to get out of order, as the tar, which will adhere to the bottom of the dip-pipe and the flange of the cone, both of which are faced, will act as a lubricant, and prevent undue wear and tear. The whole, as will be seen on inspecting the accompanying illustration, is exceedingly simple, and every part accessible. To adapt it to the present dips, all that is necessary is to face the bottom edge of the dip-pipe, and suspend a cone by a rod, which passes through the bonnet, the raising and lowering of the cone being performed through the intervention of a weighted eccentric and chain.

The Patentee will be glad to show a number of the Patented Apparatus in action, is prepared to supply them upon the most moderate terms, and will be happy to reply to any inquiries that may be addressed as under—

W. BOX,

GAS-WORKS, CRAYFORD, KENT.

GEORGE ORME & CO.,

ATLAS METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET AND DRY GAS-METERS,

STATION-METERS, GOVERNORS,

PRESSURE AND EXHAUST REGISTERS,

LAMP-METERS IN CAST-IRON BOXES,

And every Description of Gas Apparatus.

B. GIBBONS, JUN.,

DIBDALE FIRE-CLAY, BRICK, AND GAS-RETORT WORKS,

STOURBRIDGE (Established 1834),

MANUFACTURER OF EVERY DESCRIPTION OF

Burs, Lumps, Stays, Shields & other Bricks, & Gas-Retorts.

A LARGE QUANTITY OF RETORTS ALWAYS IN STOCK.

Circular . 14 in., 15 in., 16 in., 18 in.

Ovals . . 17 in. × 14 in., 17 in. × 15 in., 20 in. × 15 in., 21 in. × 15 in., &c.

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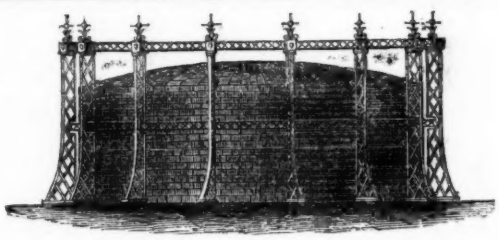
Special attention given to the execution of Export Orders.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

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GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

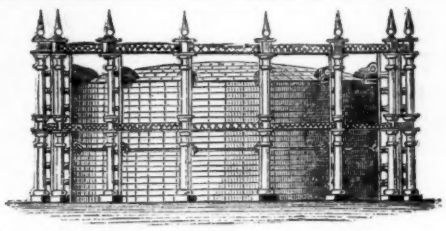
AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

HOPE IRON WORKS,



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ASHMORE & WHILE,

GAS ENGINEERS & CONTRACTORS,

MANUFACTURERS OF GASHOLDERS,

GAS APPARATUS OF EVERY DESCRIPTION,

Including Improved

Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,

And GENERAL IRONWORK.

N.B.—Estimates for all Gas Plant and Remodelling supplied on application.

JOURNAL OF GAS LIGHTING, WATER SUPPLY, AND SANITARY IMPROVEMENT.

CLOTH CASES, GILT LETTERED,
For binding Vol. XXVI., may now be obtained,
Price 2s. 6d.

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Halfpenny stamps may be forwarded for amounts under 5s. Any larger sum should be remitted by Money Order, payable at the General Post Office, to William B. King.

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The Publisher cannot be responsible for Testimonials, accompanying replies to Advertisements, left at the Office, and strongly recommends that *copies only* should be sent.

LONDON:
WILLIAM B. KING, 11, BOLT COURT, FLEET STREET, E.C.

Now ready, Price 2s. 6d., Revised Edition.

THE TRANSFER OF GAS-WORKS TO LOCAL AUTHORITIES, from 1868 to 1875, with a Review of the LONDON GAS SUPPLY. By ARTHUR SILVERTHORNE, C.E.
CROSBY, LOCKWOOD, AND CO., 7, STATIONERS HALL COURT, LONDON.

COST PRICE SHEETS.

MANUFACTURE AND DISTRIBUTION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.
South Shields. W. J. WARNER.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine; (4) Turret Clock, &c.; (5) Electric Telegraph, A B C Instruments, Bells, and Apparatus.
J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

T. NEWBIGGING,

CONSULTING GAS ENGINEER,

5, NORFOLK STREET, MANCHESTER.

Mr. ALFRED LASS,

60, CORNHILL, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

D. M. NELSON,

48, GORDON STREET (late 135, BUCHANAN ST.),
GLASGOW,

Supplies every requisite in connexion with the distribution of Gas and Water.

Estimates and prices on application.
WOOD GRIDS for Purifiers and Scrubbers.
Cast-Iron PIPES and VALVES.
Street LAMP-PILLARS.
Patent Pipe SCREWING-MACHINES, &c.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

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Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

SZERELMEY (Liquid Enamel, for Iron-work exposed to the atmosphere, supersedes paint, dries in two hours, absolutely prevents rust, contains no oil, requires no mixing, is ready for use, is laid on like paint, covers new or old iron or wood, old paint, tar, or whitewash, is waterproof, gives a fine polished surface, and costs scarcely one-fourth as much as paint—namely, one halfpenny per square yard. Samples to any address for 12 stamps. Particulars free on application.

SZERELMEY Iron Paint has stood the test of 24 years experience. The gilding on the Victoria Tower of the Houses of Parliament was laid on over it upwards of 20 years ago, and is still in perfect condition.

SZERELMEY Stone Paint thoroughly waterproofs brick and other walls without giving them the appearance of having been painted.

COPIES of Reports on the Szerelmey compositions, by Sir Charles Barry, Sir R. J. Murchison, and Professor Faraday (printed by order of the House of Commons), with other information, may be had on application.

NONE of the Szerelmey compositions contain white or red lead, arsenic, or any other injurious ingredient. When in use and while drying they have a purifying effect on the atmosphere.

SZERELMEY Liquid Enamel.—The cost of the Enamel when laid on is about one halfpenny per square yard. We are now entering orders for execution at any time before the end of March, at £25 per ton, subject to a liberal discount for cash, particulars of which we will send, if asked. A ton measures about 125 gallons, and is ready for use.

SHIPPERS will receive liberal treatment at our hands. They will find that our Enamel Paste can be supplied for shipment at a price with which no ordinary paint can compete.

SZERELMEY Debentures.—Investors desirous of subscribing for the remainder are requested to intimate their intention as early as possible. The debentures will be dated Jan. 1, 1876; from that date interest at 8 per cent. per annum (for which coupons are attached) will be paid quarterly. No prospectus will be advertised, but full particulars will be sent in reply to any application addressed to N. C. SZERELMEY AND COMPANY, Limited, 24, City Bank Chambers, Threadneedle Street, LONDON, E.C.

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IN THE MATTER OF
BRONNER'S GAS-BURNERS.

HENRY GREENE AND SON, 155, Cannon Street, London, Sole Agents for Great Britain, Ireland, and Colonies, of Brönner's Improvements in Gas Lighting, beg to inform the public that on the 13th of January, 1876, Julius Brönner obtained an injunction in the Court of Session, Scotland, against Donald M'Vean, Gas-Fitter, 14, Newton Street, Glasgow, prohibiting him from in any way advertising or offering for sale as Brönner's Burners, any Burner not manufactured by Julius Brönner, or from in any way inducing the public to believe that the said Donald M'Vean sells or keeps for sale Brönner's Burners, manufactured by Julius Brönner, while such is not the case.

Also that on the 9th of November, 1875, he obtained injunction in the same Court, and in the same terms, against R. M. Brechin and Co., 46, North Hanover Street, Edinburgh.

Also that on the 20th of April, 1875, in a suit in Chancery, before Vice-Chancellor Malins, number 1874, B 365, he obtained injunction against another defendant, in the same terms and on similar grounds.

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(ESTABLISHED MORE THAN 15 YEARS,)
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Steam-Jet Engineers,
SOLE LICENSEES FOR
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AND
W. CLELAND'S PATENT STEAM SCRUBBER,
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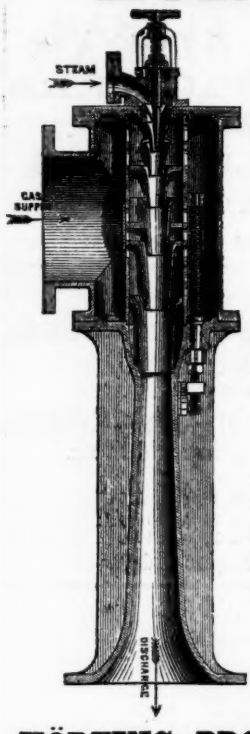
Germany: Cellerstr. 35, Hannover.
Austria: Kolring., Pestalozzigasse 6, Vienna.
France: 11, Rue Louis-le-Grand, Paris.
U. S.: 1645, N. 10th St., Philadelphia.



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STEAM-JET GAS-EXHAUSTER.

Small Cost—Compactness—Perfectly Self-Acting—Self-Regulating—Self-Cleansing—No Steam-Engine—No Attention—No Extra Room Required—No Wear and Tear—No Noise—No Oscillation in Vacuum, or Back Pressure.

UPWARDS OF 200 IN USE.
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Combining small cost and thorough efficiency, with absence of any mechanical means and necessity of renewing the scrubbing material.

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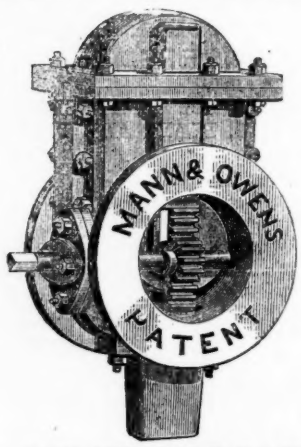
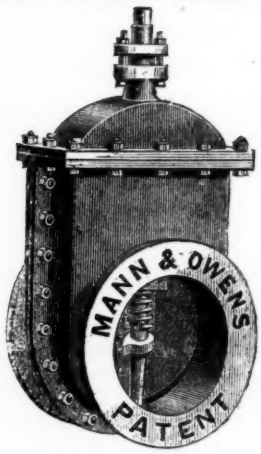
SOLE AGENT FOR ENGLAND AND WALES.

MANN & OWENS' PATENT GAS-VALVE.



RACK AND PINION VALVE.



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The advantages of this Patent Valve over all others yet introduced are, that it is always as tight as the best wedge or spring valve, without the possibility of setting fast or becoming suddenly leaky. The surfaces not being in contact during the operation of opening or closing, leakage through wear and tear is avoided.

The Gas Engineer will not fail to see the importance of such a valve in connexion with his purifying apparatus, particularly in the case of large sizes.

The slide being operated either by a screw and nut, or by a pinion and rack, a cam bearing upon a plane, cast on the back of the Valve, forces it against the face, and renders the escape of gas an impossibility. By a slight turn of the pinion or screw, the slide is released, and brought away from the face, by which means friction is avoided, and the only force required to open the Valve is that due to its own weight.

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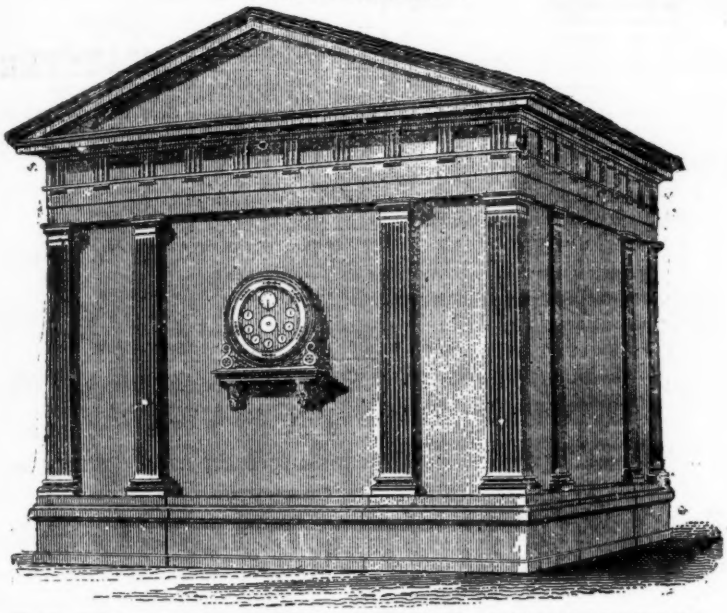

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WITH PLANED JOINTS.

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TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

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RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES.

FUEL-MACHINE, for Compressing Breeze and Tar.

WASHERS, SCRUBBERS, and PURIFIERS, that Economize Space and Cost.

N.B.—Pamphlet, with Eighteen Illustrations of the foregoing, with letterpress on the construction of Gas-Works, post free, 2s. 6d.

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J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

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Owner of the Works at which Fire-Clay Retorts were first made), can supply

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References can be given to managers of above a hundred Gas-Works whom he supplies.

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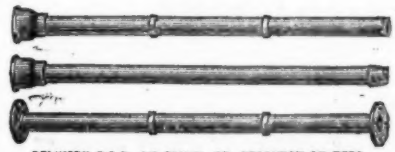

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Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

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Yields 13,320 cubic feet of 32·5-candle gas per ton.
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This Coal yields 11,000 cubic feet of gas and 13½ cwts. of coke per ton.
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Supply and Contract for all the principal Scotch Cannel Coal (including BOGHEAD, HARTHILL, RIGSIDE, CHAPELSIDE, LESMAHAGOW, and BRAEHEAD), f.o.b., or delivered at home or abroad.
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PREVENTS WASTE OF GAS FROM RETORTS;
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GREATLY ECONOMIZES THE USE OF FIRE-BRICKS;
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COPPA COLLIERY, MOLD,
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CANNEL FOR GAS-MAKING PURPOSES.
This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.
Ports of shipment—Birkenhead or Connah's Quay.
Waggons supplied for delivery by railway to any part of England or Wales.
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Cubic feet of Gas yielded per ton . . . 10,050
Illuminating power in sperm candles . . 15·4
Yield of coke per ton of good quality . . 13¾ cwts.
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PLUTONIC CEMENT
For Repairing and Jointing Gas-Retorts, and preventing porosity.
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MESSRS. NEWTON, CHAMBERS, & CO.,
THORNCLIFFE IRON-WORKS AND COLLIERIES,
NEAR SHEFFIELD,
STRONGLY RECOMMEND A TRIAL OF THEIR
CELEBRATED SILKSTONE GAS NUTS.

Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

These Nuts are extensively used by various Gas Companies throughout the Kingdom, who bear strong testimony to their value.

APPLICATIONS FOR PRICES, &c., TO BE SENT DIRECT TO THE COLLIERY, AS ABOVE.

GAS PURIFICATION & CHEMICAL Co., LIMITED,

(Successors to JOHN WILLIAM O'NEILL & CO.,)

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CONTRACTORS FOR GAS PURIFICATION BY OXIDE OF IRON.

The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

JOHN WILLIAM O'NEILL,
SAMUEL H. JOHNSON, } Joint Managing Directors.

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THE DERBYSHIRE

SILKSTONE COAL COMPANY, LIMITED,

CAN OFFER A

GAS COAL

Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average)	**10,775**
Weight of coke in lbs. per ton of coal	**1,465**

ANALYSIS AND PRICES ON APPLICATION TO

Mr. EDMUND TAYLOR, Secretary,

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THE LOCHORE AND CAPLEDRAE CANNEL COAL COMPANY, LIMITED.

Works: LOCHORE by LOCHGELLY, FIFESHIRE. Office: CUSTOM HOUSE CHAMBERS, LEITH.

This Company request attention to the very superior quality of their Cannel Coals.

1. The following are the practical results given by Dr. Wallace, of Glasgow, of analyses of their Lochore and Capledrae Cannels:—

	Sample worked at Capledrae.	Sample worked at Lochore
Gas per ton of coal, at 60° Fahr. and 30 inches barometric pressure . .	13,095 cubic feet. ..	11,760 cubic feet.
Illuminating power, in standard sperm candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	32·91 ..	34·83
Value of 1 cubic foot of gas in grains of sperm	780 ..	836
Equivalent of a ton of coal in pounds of sperm candles	1,459 ..	1,404
Durability of 1 cubic foot by 5-inch flame	69 minutes. ..	71 minutes.
Gravity of the gas (air = 1000)	596 ..	594

Remarks.—This (the sample from Capledrae) is a Cannel Coal of first-class quality, giving 13,000 feet of 33-candle gas. It contains only a minute proportion of sulphur, and the ash is almost quite white. The coke is of rather inferior quality.

Remarks on Sample from Lochore.—This is a Cannel Coal of first-class quality, giving a large yield of very rich gas and a coke of medium quality.

2. The following are the practical results of analyses by Dr. Wallace of the Company's Waverley Cannels:—

	Capledrae Waverley.	Lochore Waverley.
Gas per ton of coal, at 60° Fahr. and 30 inches barometer	9,120 cubic feet. ..	11,145 cubic feet.
Illuminating power, in standard candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	36·62 ..	33·09
Value of 1 cubic foot of gas in grains of sperm	878 ..	794
Equivalent of a ton of coal in pounds of sperm candles	1,145 ..	1,264
Durability of 1 cubic foot of gas by 5-inch flame	80 minutes. ..	67 minutes.
Gravity of the gas (air = 1000)	677 ..	597

Remarks on the Sample of Capledrae Waverley.—This Coal gives fully 9000 feet of gas of 36½ candles, and is admirably adapted for bringing up the quality of gas made from common coal or inferior qualities of cannel. The tests were made at a rather high temperature, this being one of the coals that stand a very high heat without serious diminution of the illuminating power of the gas The coke contains 60 per cent. of ash, and is therefore almost valueless, but the proportion of sulphur is very moderate.

Remarks on the Lochore Waverley.—This is a first-class Cannel Coal, giving 11,000 cubic feet of 33-candle gas. The quantity of sulphur is very minute, and the ash is nearly white. The coke is of inferior quality, but not wholly valueless.

Applications for full Copies of Analyses and Prices may be made to the Company.

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(INVENTED & PATENTED IN 1844,)

COMBINING ALL THE LATEST IMPROVEMENTS,

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Of the most perfect description for all purposes relating to Gas.

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IMPROVED DRY GAS-METERS, in Cast-Iron or Tin-Plate Cases;

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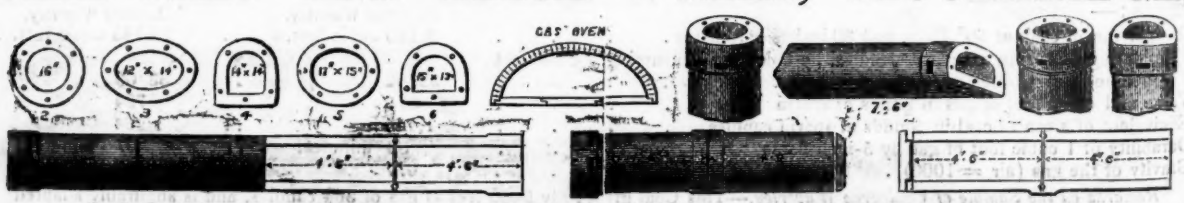

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London: Printed by WILLIAM BOUGHTON KING (at the office of Clayton and Co., 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, February 22, 1876.